Fastener Tightening Specifications

Application	Specification	
	Metric	English
Condenser to Radiator Retaining Bolt	11 N·m	97 lb in
Coolant Air Bleed Hose Retaining Clamp	4 N·m	35 lb in
Coolant Air Bleed Pipe Retaining Bolts	12 N·m	106 lb in
Coolant Inlet Pipe to Alternator Bracket Retaining Nut - 3.6L	25 N·m	18 lb ft
Coolant Recovery Reservoir Retaining Nuts	17 N·m	13 lb ft
Cooling Fan Blade Retaining Nut	6 N·m	53 lb in
Cooling Fan Motor to Fan Shroud Bolt	10 N·m	89 lb in
Coolant Inlet Pipe Retaining Bolt	35 N·m	26 lb ft
Heater Pipe Assembly to Thermostat Housing Retaining Bolts - 3.6L	10 N·m	89 lb in
Radiator Cap	5 N·m	44 lb in
Radiator Drain Plug	2 N·m	18 lb in
Thermostat Housing Retaining Bolts - 6.0L	14 N·m	124 lb in
Thermostat Housing to Cylinder Block Retaining Bolts - 3.6L	10 N·m	89 lb in
- Water Pump to Engine Front Cover Retaining Bolts - 3.6	10 N·m	89 lb in
- Water Pump Pulley to Water Pump Retaining Bolts - 3.6	10 N·m	89 lb in
Water Pump Retaining Bolts - 6.0L	25 N·m	18 lb ft
- First Pass	15 N·m	11 lb ft
- Final Pass	25 N·m	18 lb ft

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Cooling System Draining and Filling (3.6 L)

Draining Procedure

Warning: Refer to Battery Disconnect Warning in the Preface section.

1. Disconnect the battery ground cable from the battery. Refer to Battery Negative Cable Disconnection and Connection.

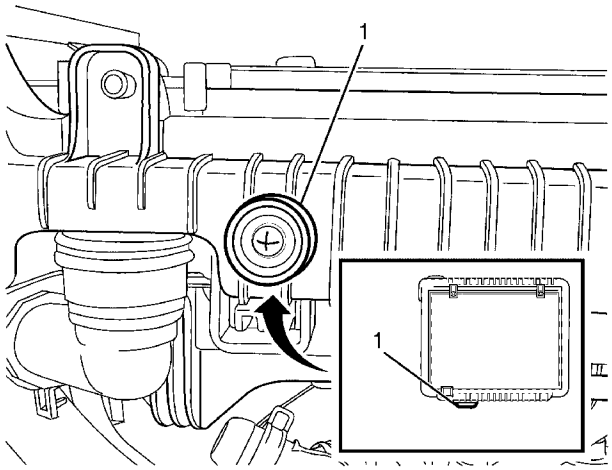
   Warning: Refer to Radiator Cap Removal Warning in the Preface section.

   Warning: Refer to Safety Glasses Warning in the Preface section.

2. Ensure engine is below 50°C before removing the coolant pressure cap.

   Danger: To avoid any vehicle damage, serious personal injury or death when major components are removed from the vehicle and the vehicle is supported by a hoist, support the vehicle with jack stands at the opposite end from which the components are being removed and strap the vehicle to the hoist.

3. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.



4. Place a drain pan under the drain cock (1).

   Note: If drain cock is not being replaced do not remove it from the radiator.

5. Loosen the drain cock until coolant flows out of the radiator.
6. Inspect the engine coolant for the following conditions:
   - Discolored appearance--Follow the flush procedure. Refer to Coolant System Flushing.
   - Normal in appearance--Follow the filling procedure. Refer to Cooling System Draining and Filling.

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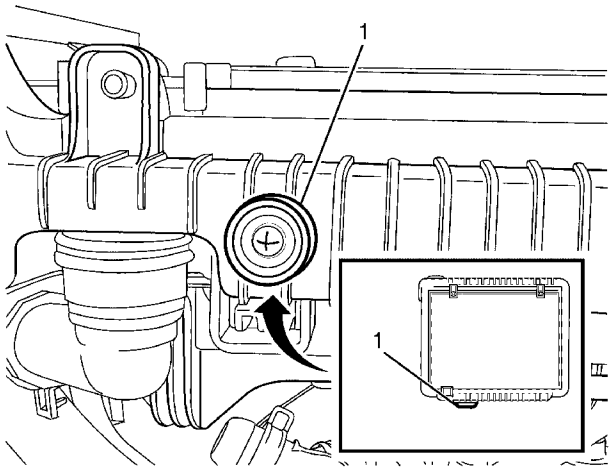
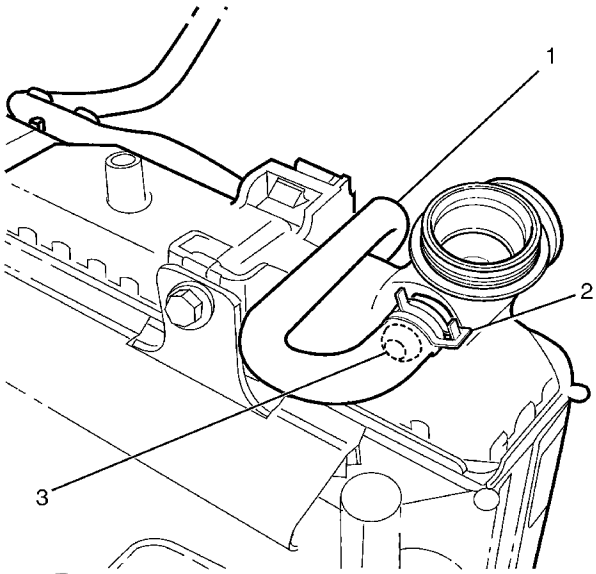
Filling Procedure



1. Tighten the drain cock (1).
2. Lower the vehicle.
3. With the engine off, remove the coolant filler cap.



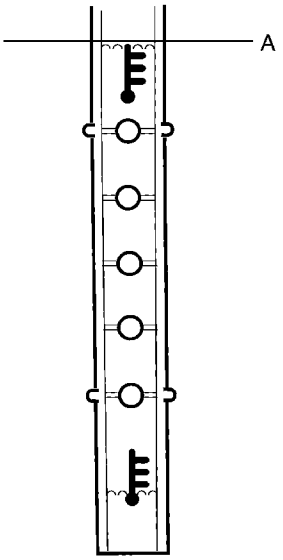
4. Remove the engine coolant air bleed hose (1) by releasing retaining hose clamp (2) and remove it from the radiator spigot (3).

   Note: When pouring coolant take care not to spill any coolant onto the accessory drive belts. If spilling occurs, rinse the belts immediately with water.

5. Slowly fill the cooling system with a mixture of 50/50 dex cool and water until coolant flows

out of air bleed hose spigot. Refit air bleed hose.

6. Continue to fill the system until full. Wait several seconds and "top up" if levels drops.
7. Start engine.
8. With engine idling top up coolant until full, wait for several seconds and "top up" if level drops.
9. Stop engine, wait several seconds and "top up" if level drops.
10. When full, fit coolant filler cap and switch off engine.



11. Check coolant in coolant recovery reservoir. Adjust coolant in the reservoir to the top of the graphic mark (A) on the dipstick.

Cooling System Draining and Filling (6.0 L)

Draining Procedure

Warning: Refer to Battery Disconnect Warning in the Preface section.

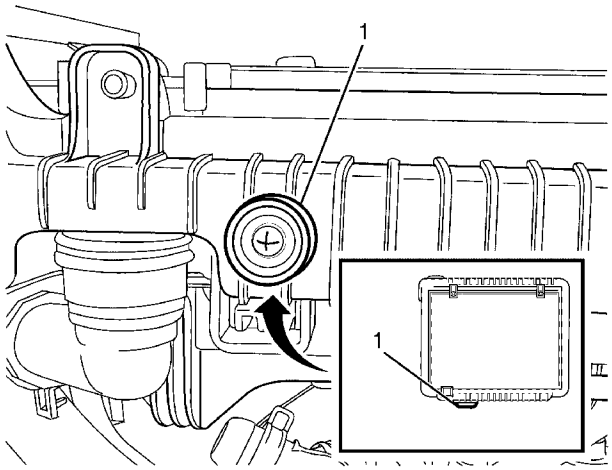
Warning: Refer to Radiator Cap Removal Warning in the Preface section.

Warning: Refer to Safety Glasses Warning in the Preface section.

1. Disconnect the battery ground cable from the battery. Refer to Battery Negative Cable Disconnection and Connection.
2. Ensure engine is below 50°C before removing the coolant pressure cap.

Danger: To avoid any vehicle damage, serious personal injury or death when major components are removed from the vehicle and the vehicle is supported by a hoist, support the vehicle with jack stands at the opposite end from which the components are being removed and strap the vehicle to the hoist.

3. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.



4. Place a drain pan under the drain cock (1).

Note: If drain cock is not being replaced do not remove it from the radiator.

5. Loosen the drain cock until coolant flows out of the radiator.
6. Inspect the engine coolant for the following conditions:
   - Discolored appearance--Follow the flush procedure. Refer to Coolant System Flushing.
   - Normal in appearance--Follow the filling procedure. Refer to Cooling System Draining and Filling.

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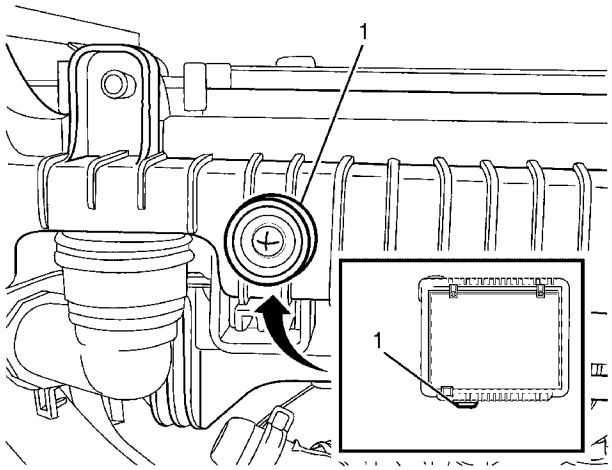
Filling Procedure



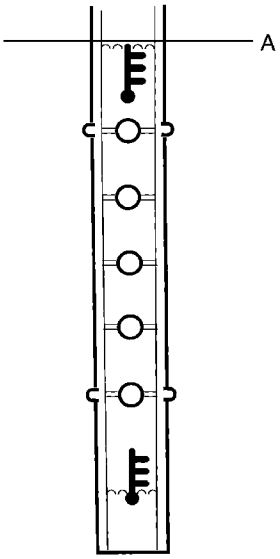
1. Tighten the drain cock (1).
2. Lower the vehicle.
3. With the engine off, remove the coolant filler cap.

Note: When pouring coolant take care not to spill any coolant onto the accessory drive belts. If spilling occurs, rinse the belts immediately with water.

4. Slowly fill the cooling system with a mixture of 50/50 dex cool and water until coolant flows out of air bleed hose spigot. Refit air bleed hose.

Note: Lift the radiator top hose underneath the air intake tube, to release air bubble in hose, top up if level drops.

5. Start engine.
6. With engine idling top up coolant until full, wait for several seconds and "top up" if level drops.
7. When full, fit coolant filler cap and switch off engine.



8. Check coolant level in coolant recovery reservoir. Adjust coolant level in the reservoir to the top of graphic mark (A) on the dipstick.

Coolant System Flushing

Radiator Flush

1. Drain the cooling system. Refer to Cooling System Draining and Filling.

   Warning: Refer to Safety Glasses Warning in the Preface section.

2. Remove the lower radiator outlet hose at the coolant inlet pipe connection.
3. Remove the upper radiator inlet hose at the coolant outlet housing connection.

   Note: When attaching the lead away hose, make sure not to block the air bleed hose.

4. Attach a lead away hose to the open end of the upper radiator hose.
5. Attach a suitable piece of hose or adaptor between the flushing gun and the open end of the lower radiator hose.
6. Connect and operate the flushing equipment as recommended by the manufacturer.

   Note: Make sure to apply air pressure gradually and not in excess of 130 kPa.

7. Continue flushing until water from the lead away hose runs clean and clear.
8. Install all disconnected hoses, ensuring that they are correctly position and securely clamped.
9. Fill the cooling system. Refer to Cooling System Draining and Filling.
10. Pressure test the cooling system. Refer to Cooling System Leak Testing.

Heater Hoses and Core

Note: Do not use a chemical flush.

Store used coolant in the correct manner, such as in a used engine coolant holding tank. Do not pour used coolant down a drain. Ethylene glycol antifreeze is a very toxic chemical. Do not dispose of coolant into the sewer system or ground water. This is illegal and ecologically unsound.

1. Drain the cooling system. Refer to Cooling System Draining and Filling.

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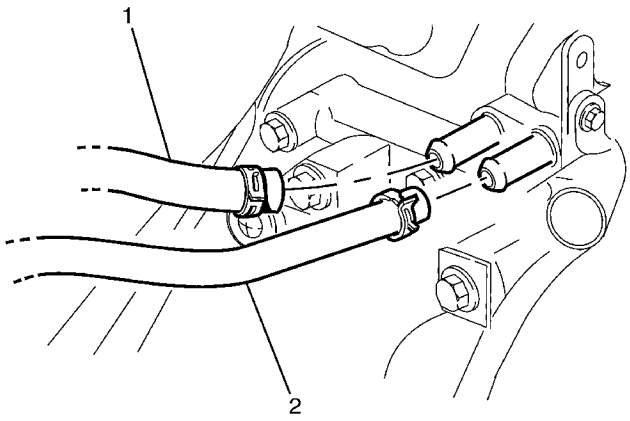
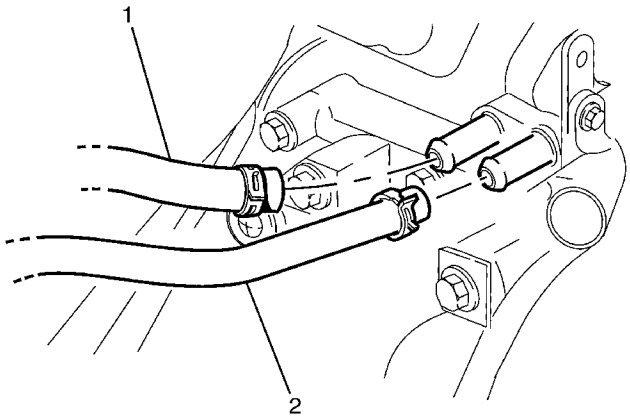


Note: Make a note of how the inlet and outlet hoses were removed for correct installation.

2. Remove both heater hoses (1, 2) from their connections at the water pump.
3. Direct the hose (1) that was connected to the water pump's rear-most connection into a suitable container.
4. Attach the hose (2) from the front connection to the flushing gun.

Note: Make sure to apply air pressure gradually and not in excess of 130 kPa.

5. Connect and operate the flushing gun.



6. Install the heater hoses (1, 2), ensuring they are installed in the correct positions.
7. Fill the cooling system. Refer to Cooling System Draining and Filling.

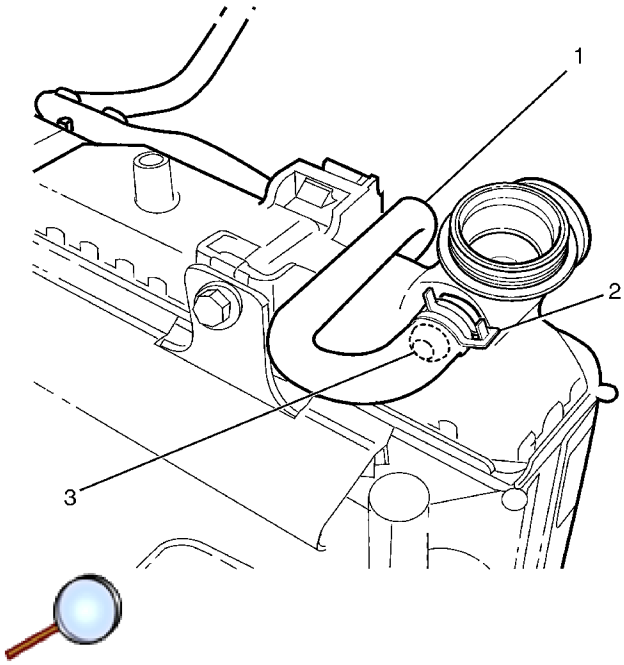
8. Pressure test the cooling system. Refer to Cooling System Leak Testing.

Engine

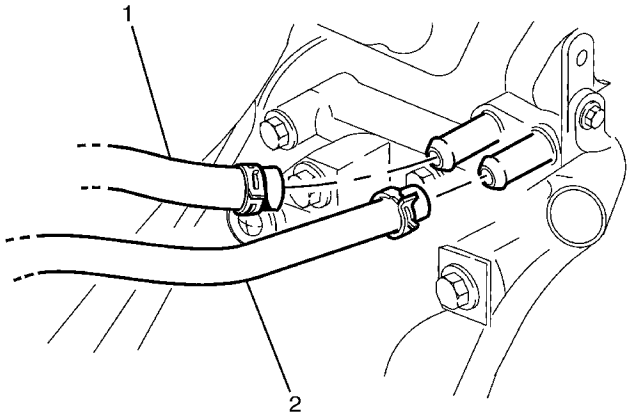
Note: Do not use a chemical flush.

Store used coolant in the correct manner, such as in a used engine coolant holding tank. Do not pour used coolant down a drain. Ethylene glycol antifreeze is a very toxic chemical. Do not dispose of coolant into the sewer system or ground water. This is illegal and ecologically unsound.

1. Drain the cooling system. Refer to Cooling System Draining and Filling.
2. Detach the inlet hose. Refer to Radiator Inlet Hose Replacement.
3. Detach the outlet hose. Refer to Radiator Outlet Hose Replacement.
4. Remove the thermostat housing. Refer to Engine Coolant Thermostat Housing Replacement.
5. Remove the thermostat. Refer to Engine Coolant Thermostat Replacement.
6. Install the thermostat housing. Refer to Engine Coolant Thermostat Housing Replacement.

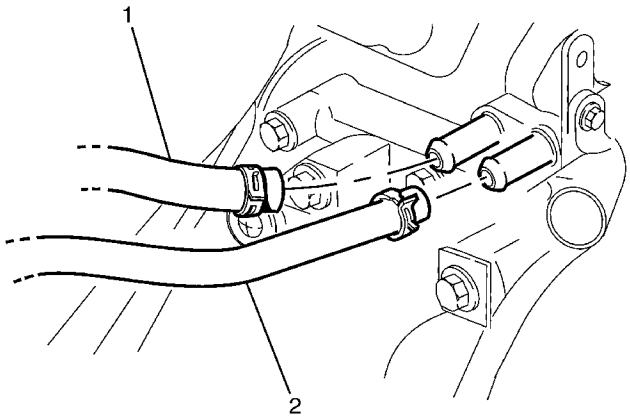


7. Remove the engine coolant air bleed hose (1) by releasing retaining hose clamp (2) and remove it from the radiator spigot (3) and temporarily plug the end of the hose.

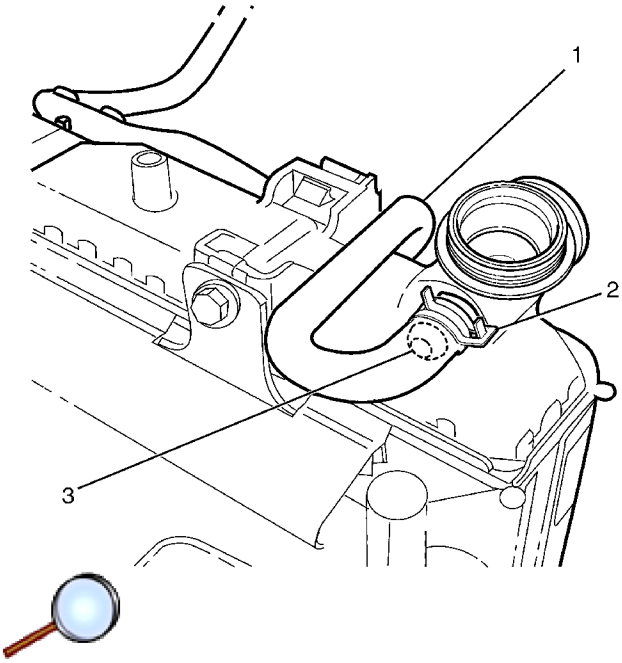


Note: Make a note of how the inlet and outlet hoses were removed for correct installation.

8. Remove the heater hoses (1, 2) from their connections at the water pump. Seal the pump connections by looping the water pump heater inlet connection to the outlet connection using a suitable piece of hose and two retaining clamps.
9. Install a lead-away hose to the thermostat housing and a length of suitable hose between the water pump outlet fitting and the flushing gun.
10. Connect and operate the flushing gun.
11. Unplug the air bleed hose and continue flushing until the water runs clear.



12. Install the heater hoses (1, 2), ensuring they are installed in the correct positions.
13. Install the thermostat. Refer to Engine Coolant Thermostat Replacement.
14. Install the thermostat housing. Refer to Engine Coolant Thermostat Housing Replacement.



15. Attach the coolant air bleed hose (1) to the radiator spigot (3).
16. Secure the coolant air bleed hose (1) with the retaining hose clamp (2)
17. Attach the outlet hose. Refer to Radiator Outlet Hose Replacement.
18. Attach the inlet hose. Refer to Radiator Inlet Hose Replacement.
19. Fill the cooling system. Refer to Cooling System Draining and Filling.
20. Pressure test the cooling system. Refer to Cooling System Leak Testing.

Radiator Cleaning

Warning: NEVER spray water on a hot heat exchanger. The resulting steam could cause personal injury.

Caution: The heat exchanger fins are necessary for good heat transfer. Do not brush the fins. This may cause damage to the fins, reducing heat transfer.

Note: Remove bugs, leaves, dirt, and other debris by blowing compressed air through the engine side of the radiator.

- Some conditions may require the use of warm water and a mild detergent.
- Clean the A/C condenser fins.
- Clean between the A/C condenser and radiator.
- Clean the radiator cooling fins.
- Straighten any damaged cooling fins.

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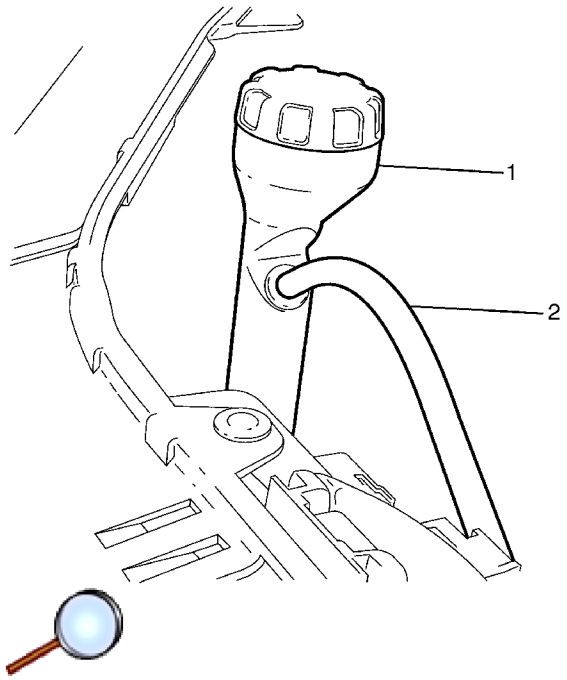
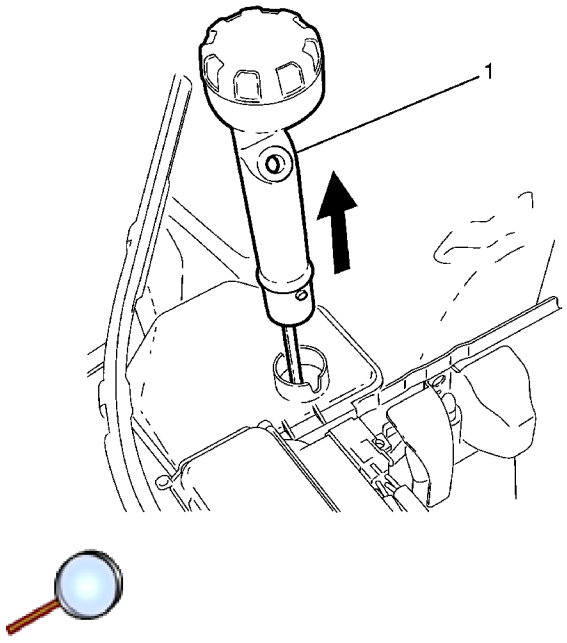
Coolant Recovery Reservoir Replacement

Removal Procedure

1. Remove the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement.



2. Disconnect the coolant recovery hose (2) from the coolant recovery reservoir filler neck (1).



3. Remove the coolant recovery reservoir filler neck (1).

Warning: Refer to Safety Glasses Warning in the Preface section.

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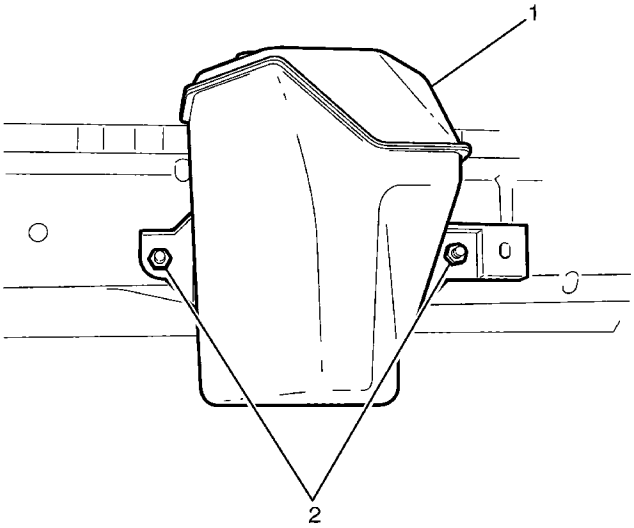
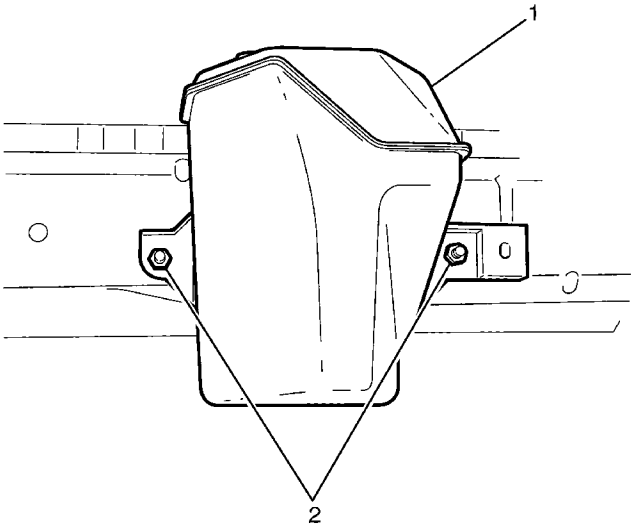
Danger: To avoid any vehicle damage, serious personal injury or death when major components are removed from the vehicle and the vehicle is supported by a hoist, support the vehicle with jack stands at the opposite end from which the components are being removed and strap the vehicle to the hoist.

4. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
5. Remove the right hand front wheel. Refer to Tire and Wheel Removal and Installation.
6. Remove the wheel house liner. Refer to Front Wheelhouse Liner Replacement.
7. Remove the air deflector. Refer to Front Air Deflector Replacement.



8. Remove the coolant recovery reservoir retaining nuts (2).
9. Remove the coolant recovery reservoir (1).

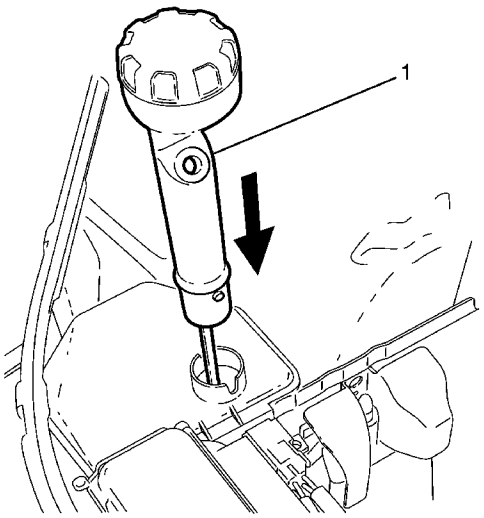
Installation Procedure



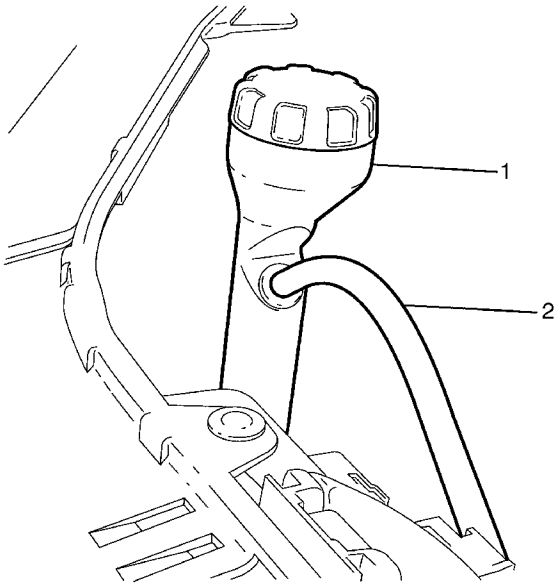
1. Install the coolant recovery reservoir (1).

Caution: Refer to Fastener Caution in the Preface section.

2. Install the coolant recovery retaining nuts (2) and tighten to **17 N·m (13 lb ft)**.
3. Install the air deflector. Refer to Front Air Deflector Replacement.
4. Install the wheel house liner. Refer to Front Wheelhouse Liner Replacement.
5. Install the right hand front wheel. Refer to Tire and Wheel Removal and Installation.
6. Lower the vehicle.



7. Install the coolant recovery reservoir filler neck (1).



8. Connect the coolant recovery reservoir hose (2) to the coolant recovery reservoir filler

neck (1)

9. Install the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement.
10. Fill the coolant reservoir to the fill level. Refer to Cooling System Draining and Filling.
11. Inspect cooling system for leaks.

Radiator Inlet Hose Replacement (3.6L)

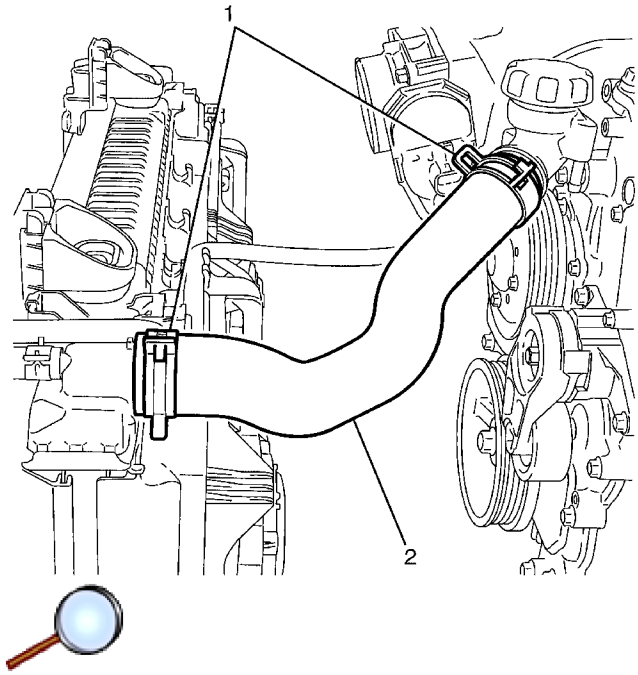
Removal Procedure

1. Drain the cooling system. Refer to Cooling System Draining and Filling.
2. Remove the engine cover. Refer to Engine Cover Replacement.
3. Remove the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement.
4. Remove the mass air flow sensor. Refer to Mass Airflow Sensor/Intake Air Temperature Sensor Replacement.
5. Remove the air intake duct. Refer to Air Cleaner Inlet Duct Replacement.

   Warning: Refer to Safety Glasses Warning in the Preface section.

   Warning: Refer to Radiator Cap Removal Warning in the Preface section.

6. Ensure engine is below 50 C before removing the coolant pressure cap.



7. Remove the retaining hose clamps (1) back on the inlet hose (2) at both ends.

   Note: If inlet hose (2) is not being replaced, leave retaining clamps (1) attached to hose.

8. Remove the inlet hose (2) at both ends.

Installation Procedure

Warning: Refer to Safety Glasses Warning in the Preface section.

Caution: Refer to Installing Hoses without Twists or Bends Caution in the Preface section.

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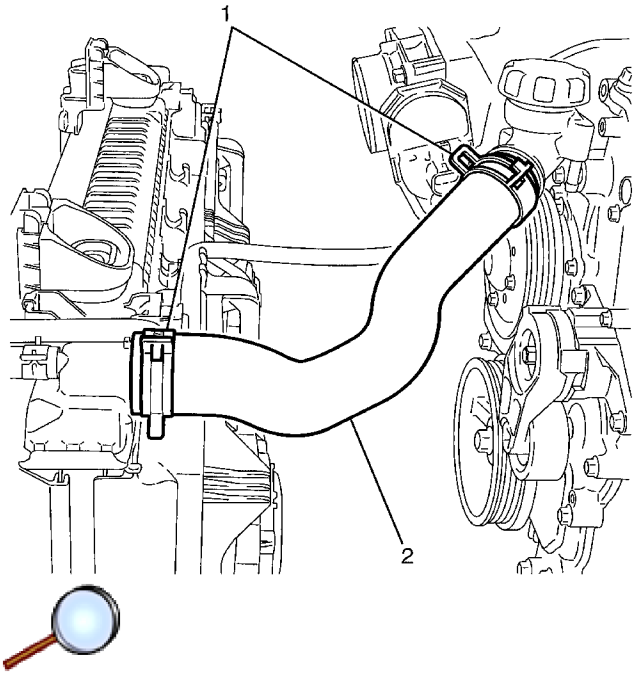


1. Install the inlet hose (2).
2. Secure the inlet hose (2) at both ends, by opening the retaining hose clamps (1) and sliding them over the hose (2).
3. Install the mass air flow meter. Refer to Mass Airflow Sensor/Intake Air Temperature Sensor Replacement.
4. Install the air intake duct. Refer to Air Cleaner Inlet Duct Replacement.
5. Install the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement.
6. Install the engine cover. Refer to Engine Cover Replacement.
7. Fill the cooling system. Refer to Cooling System Draining and Filling.
8. Inspect cooling system for leaks.

Radiator Inlet Hose Replacement (6.0L)

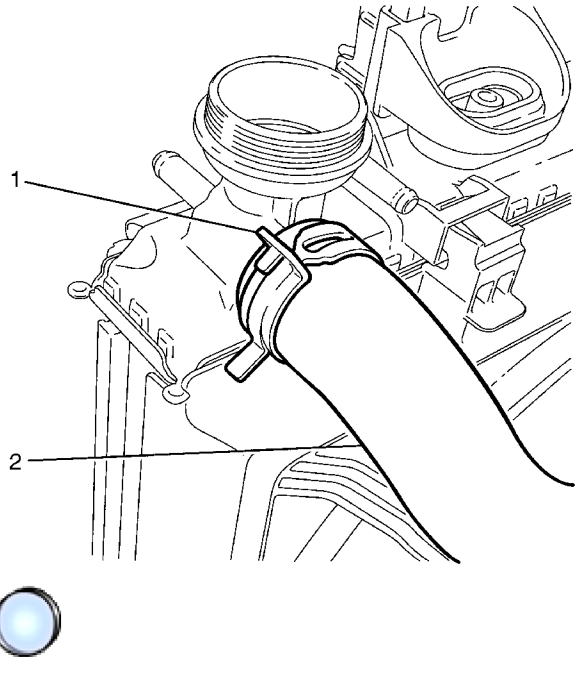
Removal Procedure

1. Drain the cooling system. Refer to Cooling System Draining and Filling.
2. Remove the engine cover. Refer to Engine Cover Replacement.
3. Remove the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement.
4. Remove the air intake duct. Refer to Air Cleaner Inlet Duct Replacement.
5. Remove the mass air flow meter. Refer to Mass Airflow Sensor/Intake Air Temperature Sensor Replacement.

   Warning: Refer to Radiator Cap Removal Warning in the Preface section.

6. Ensure engine is below 50°C before removing the coolant pressure cap.

   Warning: Refer to Safety Glasses Warning in the Preface section.



7. Release the retaining hose clamp (1) and disconnect the radiator inlet hose (2) from the radiator.

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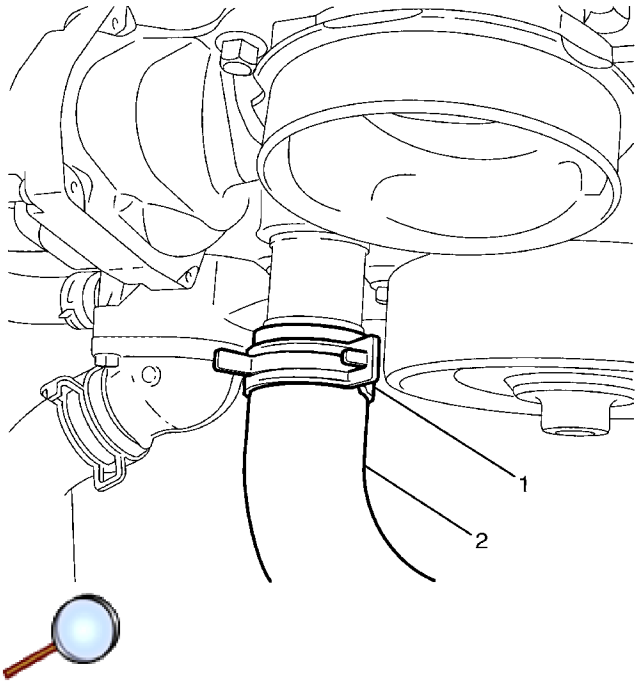


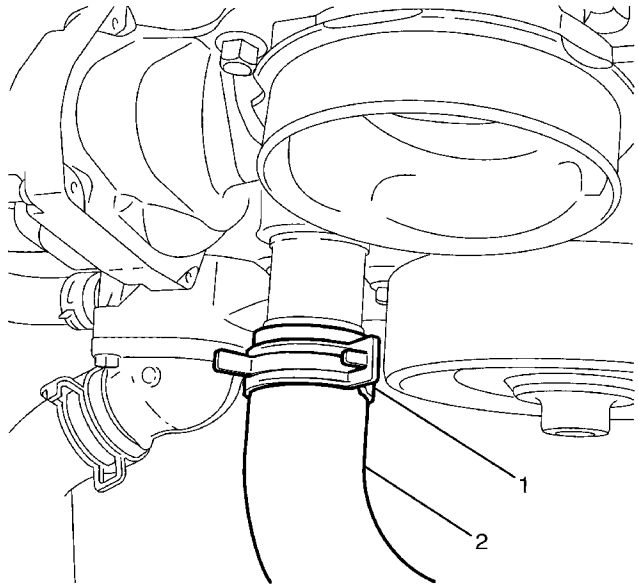
8. Release the retaining hose clamp (1) and disconnect the radiator inlet hose (2) from the water pump.

   Note: If the inlet hose (2) is not being replaced leave retaining clamp (1) attached to the inlet hose.

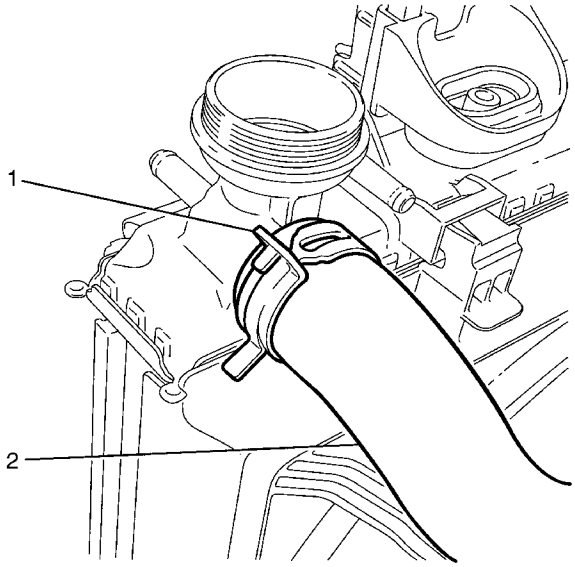
9. Remove the inlet hose (2) from both ends.

Installation Procedure

Caution: Refer to Installing Hoses without Twists or Bends Caution in the Preface section.



1. Install the inlet hose (2).
2. Secure the inlet hose (2) at the water pump end, by opening the retaining hose clamp (1) and securing it over the outlet hose (2).



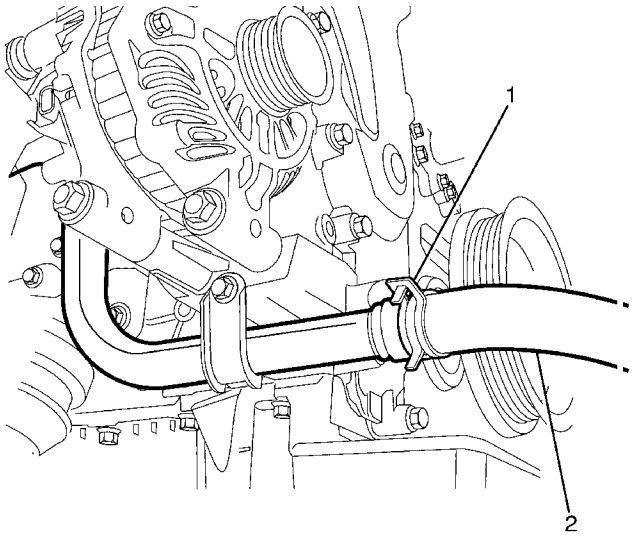
3. Secure the hose (2) at the radiator end by opening the retaining hose clamp (1) and retaining it over the hose (2).
4. Install the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement.
5. Install the air intake duct. Refer to Air Cleaner Inlet Duct Replacement.
6. Install the mass air flow sensor. Refer to Mass Airflow Sensor/Intake Air Temperature Sensor Replacement.
7. Install the engine cover. Refer to Engine Cover Replacement.
8. Fill the cooling system. Refer to Cooling System Draining and Filling.
9. Inspect cooling system for leaks.

Radiator Outlet Hose Replacement (3.6L)

Removal Procedure

1. Drain the cooling system. Refer to Cooling System Draining and Filling.

   Warning: Refer to Safety Glasses Warning in the Preface section.



   Note: If outlet hose (1) is not being replaced, leave retaining clamp (2) attached to outlet hose.

2. Release the retaining hose clamp (1) and remove the outlet hose (2).

   Danger: To avoid any vehicle damage, serious personal injury or death when major components are removed from the vehicle and the vehicle is supported by a hoist, support the vehicle with jack stands at the opposite end from which the components are being removed and strap the vehicle to the hoist.

3. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
4. Remove the air deflector. Refer to Front Air Deflector Replacement.

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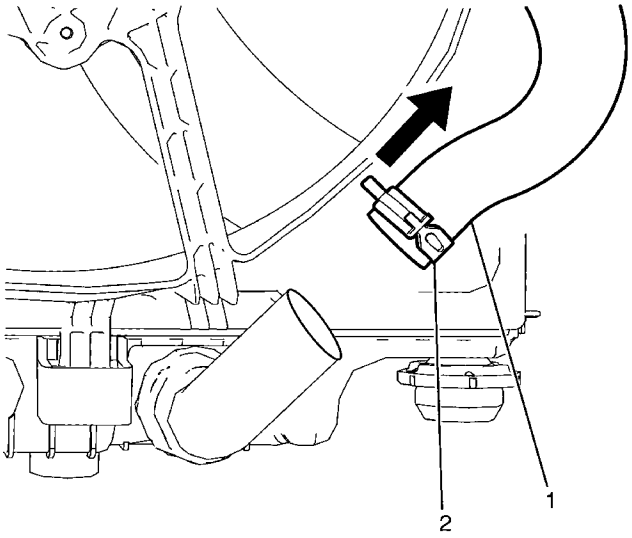


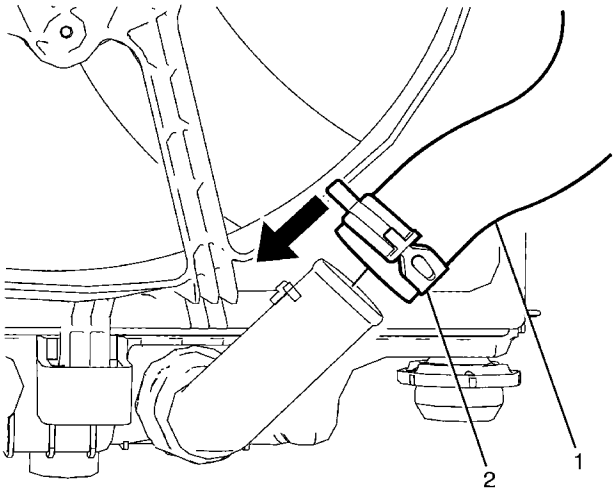
Note: If outlet hose (1) is not being replaced, leave retaining clamp (2) attached to hose.

Note: Access to the outlet hose is restricted. Removal of the cooling fans will aid access. Refer to Cooling Fan and Shroud Replacement.

5. Remove the outlet hose (1) by releasing the retaining hose clamp (2).

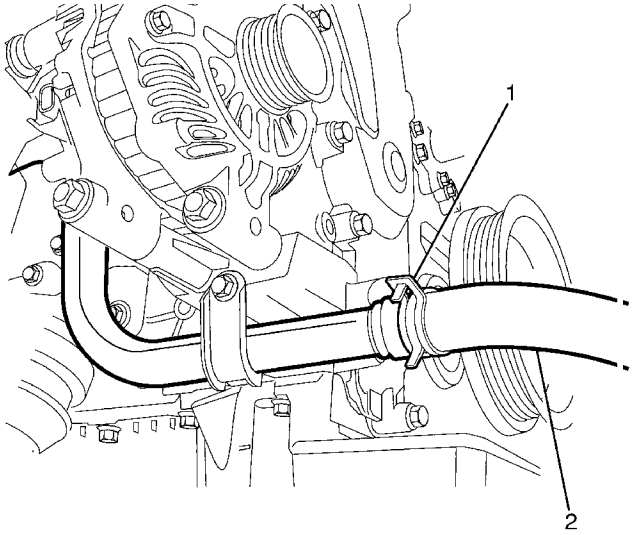
Installation Procedure

Caution: Refer to Installing Hoses without Twists or Bends Caution in the Preface section.



1. Install the outlet hose (1) and secure it with the retaining hose clamp (2).
2. Install the air deflector. Refer to Front Air Deflector Replacement.
3. Lower the vehicle.

Warning: Refer to Safety Glasses Warning in the Preface section.



4. Secure the outlet hose (2) by opening the retaining hose clamp (1) and sliding it over the hose (2).
5. Install the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement.
6. Fill the cooling system. Refer to Cooling System Draining and Filling.
7. Inspect cooling system for leaks.

Radiator Outlet Hose Replacement (6.0L)

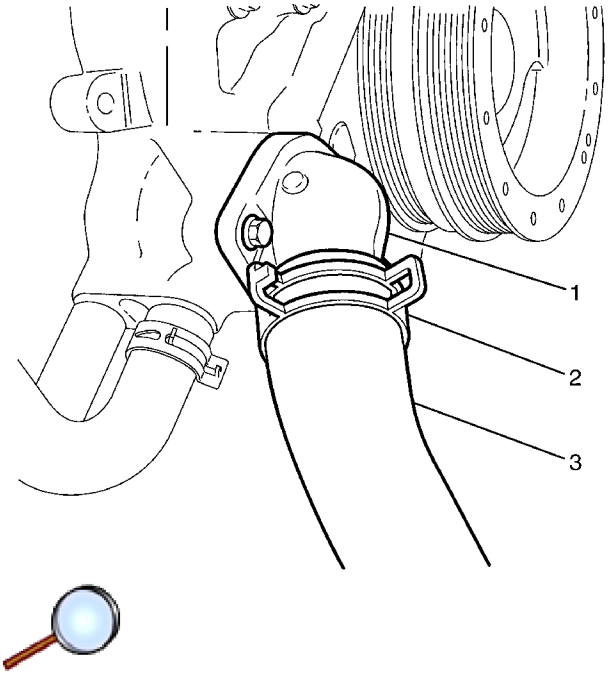
Removal Procedure

1. Drain the cooling system. Refer to Cooling System Draining and Filling.
2. Remove the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement.
3. Remove the air intake duct. Refer to Air Cleaner Inlet Duct Replacement.

Warning: Refer to Radiator Cap Removal Warning in the Preface section.

4. Ensure engine is below 50°C before removing the radiator cap.

Warning: Refer to Safety Glasses Warning in the Preface section.



Note: If outlet hose (3) is not being replaced leave retaining clamp (2) attached to hose.

5. Release the outlet hose retaining hose clamp (2).
6. Detach the outlet hose (3) from the thermostat housing (1).

Danger: To avoid any vehicle damage, serious personal injury or death when major components are removed from the vehicle and the vehicle is supported by a hoist, support the vehicle with jack stands at the opposite end from which the components are being removed and strap the vehicle to the hoist.

7. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
8. Remove the air deflector. Refer to Front Air Deflector Replacement.

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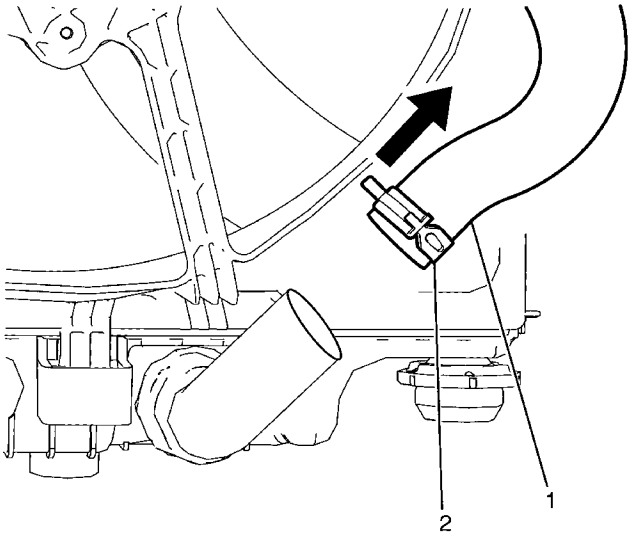


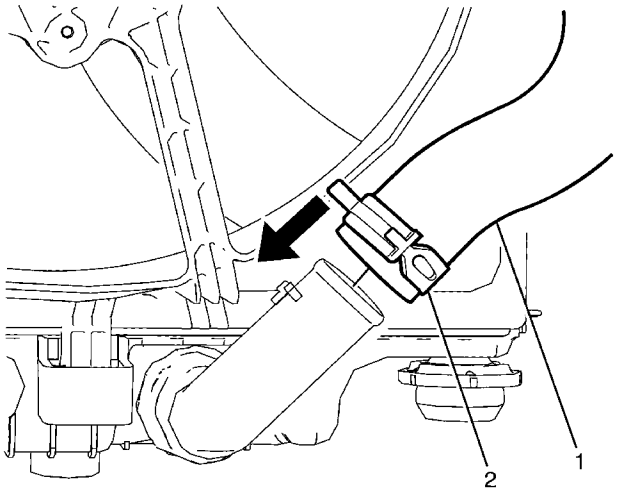
Note: If outlet hose (1) is not being replaced, leave retaining clamp (2) attached to hose.

Note: Access to the outlet hose is restricted. Removal of the cooling fans will aid with access. Refer to Cooling Fan and Shroud Replacement.

9. Remove the outlet hose (1) by releasing the retaining hose clamp (2).
10. Remove the outlet hose (1).

Installation Procedure

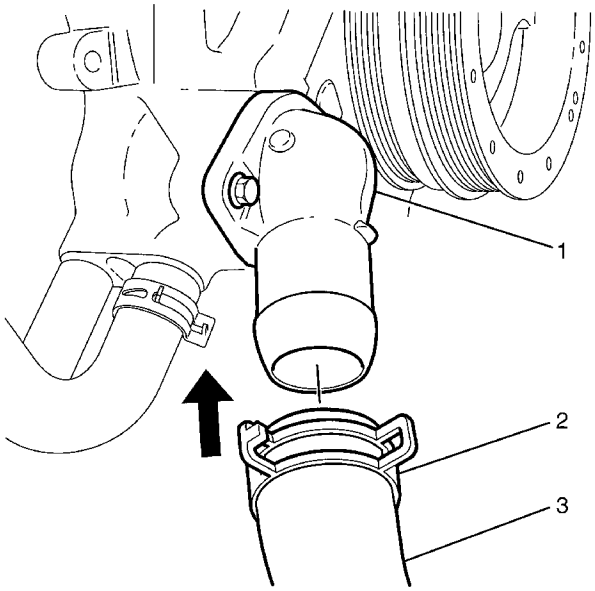
Caution: Refer to Installing Hoses without Twists or Bends Caution in the Preface section.



1. Install the bottom end of the outlet hose (1).

Note: Ensure the retaining clamp is seated correctly.

2. Secure the hose by sliding the retaining hose clamp (2) over it.
3. Install the air deflector. Refer to Front Air Deflector Replacement.
4. Lower the vehicle.



5. Install the top end of the outlet hose (3) onto the thermostat housing (1).
6. Secure the outlet hose by sliding the retaining hose clamp (2) over it.
7. Install the air intake duct. Refer to Air Cleaner Inlet Duct Replacement.
8. Install the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement.
9. Fill the cooling system. Refer to Cooling System Draining and Filling.
10. Inspect cooling system for leaks.

Engine Coolant Inlet Pipe Replacement

Removal Procedure

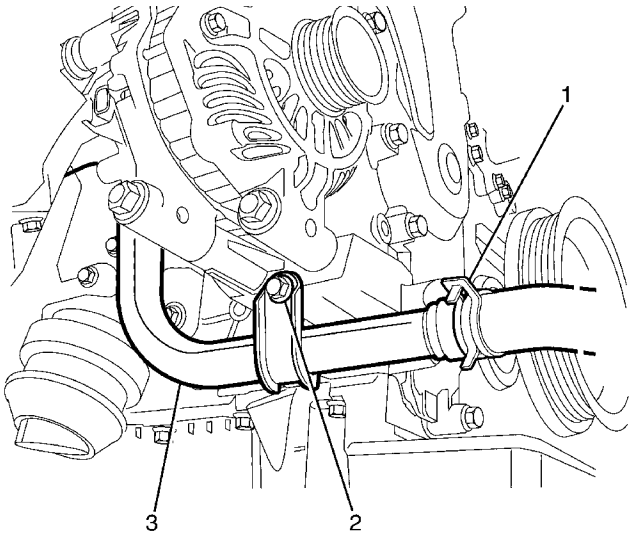
Warning: Refer to Battery Disconnect Warning in the Preface section.

1. Disconnect the battery ground cable from the battery. Refer to Battery Negative Cable Disconnection and Connection.

Warning: Refer to Radiator Cap Removal Warning in the Preface section.

2. Ensure engine is below 50°C before removing the coolant pressure cap.
3. Remove the engine cover. Refer to Engine Cover Replacement.
4. Remove the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement.
5. Remove the air intake duct. Refer to Air Cleaner Inlet Duct Replacement.
6. Drain the cooling system. Refer to Cooling System Draining and Filling.
7. Remove the right side catalytic converter. Refer to Catalytic Converter Replacement - Right Side.

Warning: Refer to Safety Glasses Warning in the Preface section.



8. Detach the lower radiator hose by removing the retaining hose clamp (1) and removing it from the coolant inlet pipe (3).

Danger: To avoid any vehicle damage, serious personal injury or death when major components are removed from the vehicle and the vehicle is supported by a hoist, support the vehicle with jack stands at the opposite end from which the components are being removed and strap the vehicle to the hoist.

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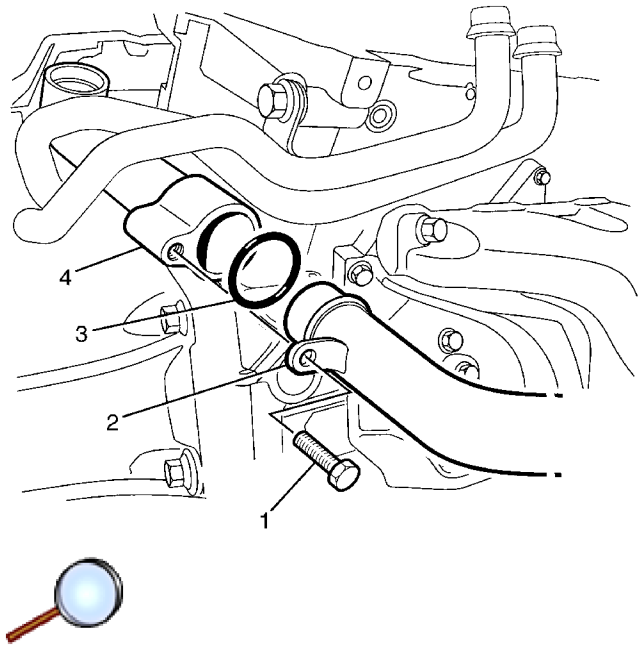
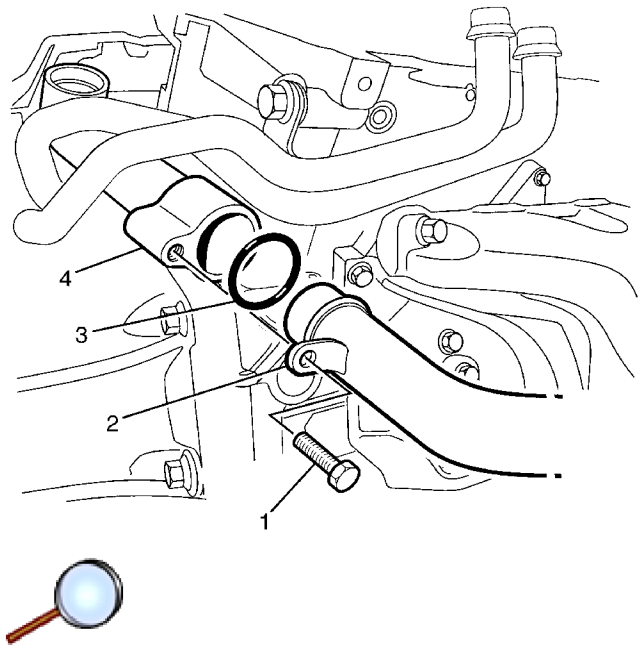
9. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
10. Remove the air deflector. Refer to Front Air Deflector Replacement.
11. Remove the coolant inlet pipe to alternator bracket retaining (2).
12. Lower vehicle



13. Remove the retaining bolt (1) which secures the inlet pipe (2) to the thermostat housing (4).
14. Manoeuvre the coolant inlet pipe towards the front of the engine and remove it from below, between the cross member and radiator.
15. Remove the coolant inlet pipe O-ring (3).

Installation Procedure

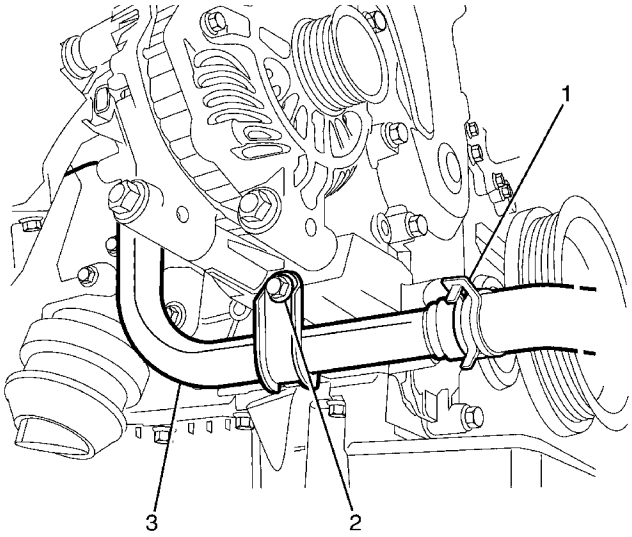


Note: Always renew the coolant inlet O-ring (3).

1. Ensure all mating surfaces are thoroughly cleaned, using only a fine abrasive material.
2. Install the coolant inlet pipe (2) at the thermostat end (4).

Caution: Refer to Fastener Caution in the Preface section.

3. Install the coolant inlet pipe retaining bolt (1) and tighten to **35 N·m (26 lb ft)**.
4. Raise and support the front of the vehicle. Refer to Lifting and Jacking the Vehicle.



5. Install the coolant inlet pipe to alternator bracket retaining nut (2) and tighten to **25 N·m (18 lb ft)**.

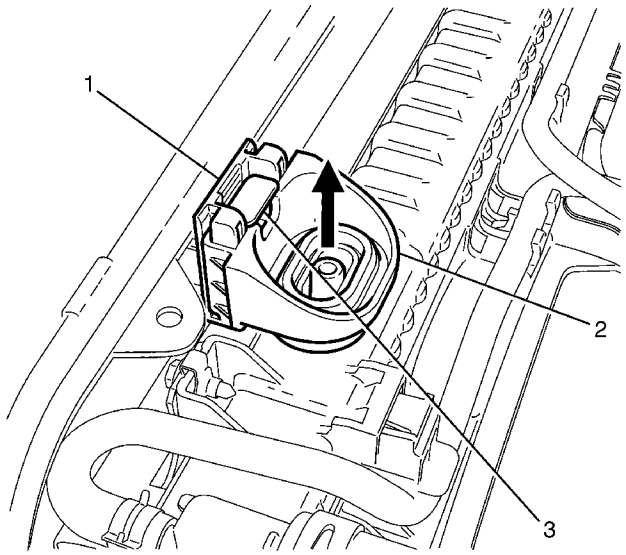
Caution: Refer to Installing Hoses without Twists or Bends Caution in the Preface section.

6. Attach the inlet hose to the inlet pipe (3) and secure with retaining hose clamp (1).
7. Install the air deflector. Refer to Front Air Deflector Replacement.
8. Lower the vehicle.
9. Remove the right side catalytic converter. Refer to Catalytic Converter Replacement - Right Side.
10. Install the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement.
11. Connect the battery ground cable to the battery. Refer to Battery Negative Cable Disconnection and Connection.
12. Fill the cooling system. Refer to Cooling System Draining and Filling.
13. Inspect cooling system for coolant leaks.

Radiator Hose Quick Connect Fitting

Removal Procedure

1. Remove the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement.
2. Drain the cooling system. Refer to Cooling System Draining and Filling.
3. Detach the radiator outlet hose. Refer to Radiator Outlet Hose Replacement.



4. Remove the radiator support brackets (2) from top of radiator by rasing the securing lock (3) 10 mm and then sliding the bracket off the radiator slide pin (1). Carry out same procedure for other bracket.
5. Raise and support the radiator assembly out of the rubber grommets located in the cross member.

Warning: Refer to Safety Glasses Warning in the Preface section.

Danger: To avoid any vehicle damage, serious personal injury or death when major components are removed from the vehicle and the vehicle is supported by a hoist, support the vehicle with jack stands at the opposite end from which the components are being removed and strap the vehicle to the hoist.

6. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
7. Remove the air deflector. Refer to Front Air Deflector Replacement.

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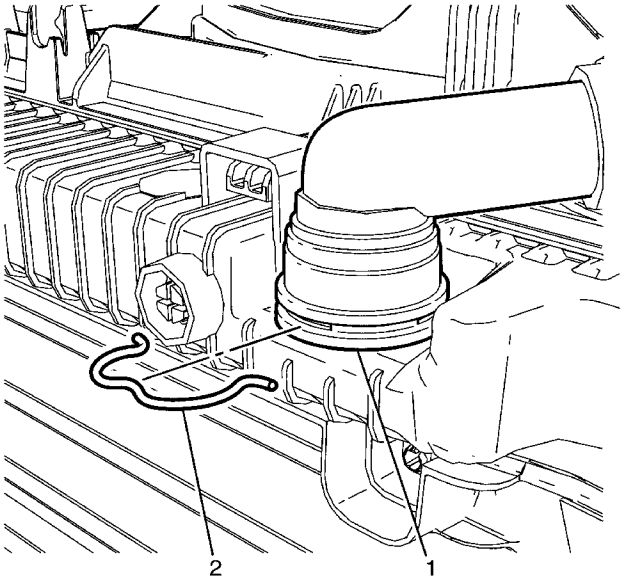
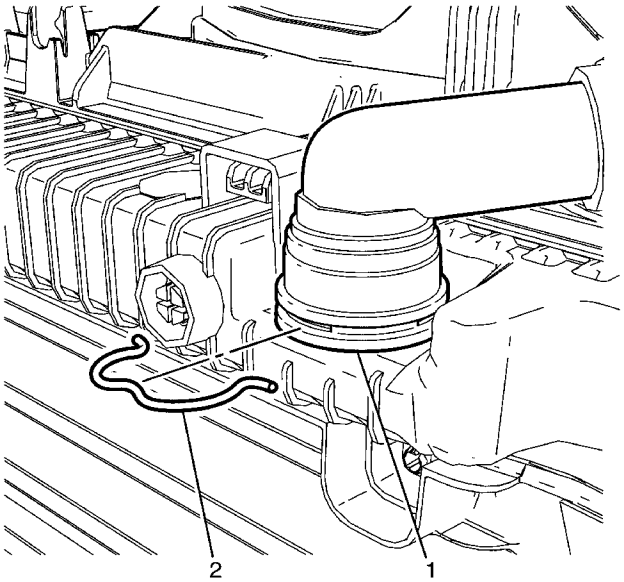


8. Remove the retaining clip (2) from the outlet hose quick connect fitting (1).
9. Remove the outlet hose quick connect fitting (1) from the radiator assembly.

Installation Procedure



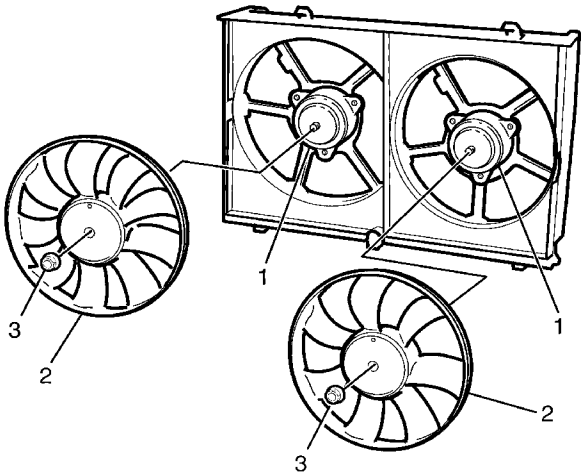
1. Install the outlet hose quick connect fitting retaining clip (2) to the quick connect fitting (1).
2. Install the outlet hose quick connect fitting (1) to the radiator spigot.
3. Install the outlet hose quick connect fitting retaining clip (2) slightly pull on the quick connect fitting to confirm fitting.
4. Install the air deflector. Refer to Front Air Deflector Replacement.
5. Lower the vehicle.
6. Attach the radiator outlet hose. Refer to Radiator Outlet Hose Replacement.

7. Fill the cooling system. Refer to Cooling System Draining and Filling.
8. Install the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement.

Engine Coolant Fan Replacement

Removal Procedure

1. Remove the cooling fan and shroud assembly. Refer to Cooling Fan and Shroud Replacement.



Note: Armature shaft and nut is left hand thread.

2. Remove the cooling fans (2) retaining nuts (3).
3. Remove the cooling fans (2) from the cooling fan motor (1).

Installation Procedure

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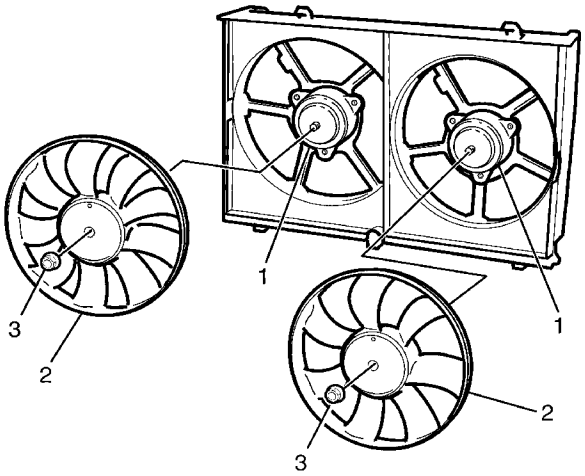


Note: When installing the cooling fans, ensure they are install as per removal.

1. Install the cooling fans (2) to the cooling fan motor (1).

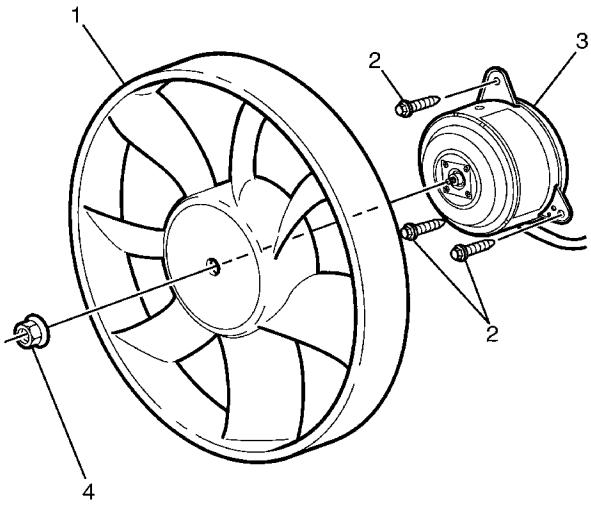
Caution: Refer to Fastener Caution in the Preface section.

2. Install the cooling fan (2) to fan motor retaining nut (3) and tighten to **6 N·m (53 lb in)**.
3. Install the cooling fan and shroud assembly. Refer to Cooling Fan and Shroud Replacement.
4. Start and run engine until cooling fans are activated.

Engine Coolant Fan Motor Replacement

Removal Procedure

1. Remove the cooling fan and shroud assembly. Refer to Cooling Fan and Shroud Replacement.



2. Disconnect electrical harness connector from motor.

   Note: Armature shaft is left hand thread.

3. Remove the cooling fan motor (3) to fan retaining nut (4).
4. Separate fan blade (1) from the fan motor (3).
5. Remove the cooling fan motor to fan shroud retaining bolts (2).
6. Remove the cooling fan motor from shroud.

Installation Procedure

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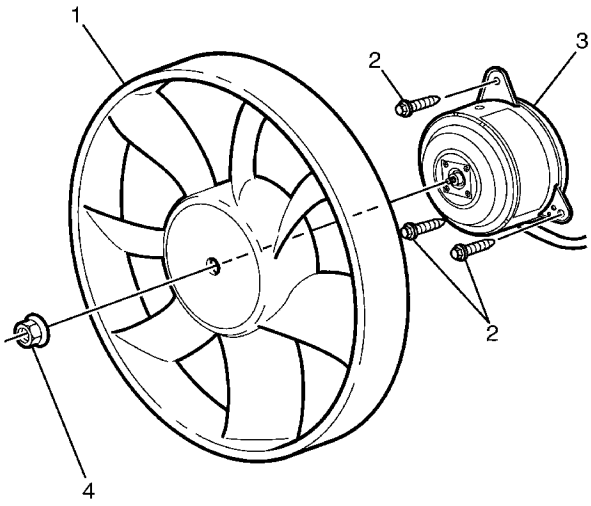


1. Install the cooling fan motor (3) to shroud.

   Caution: Refer to Fastener Caution in the Preface section.

2. Install cooling fan motor to shroud retaining bolts (2) and tighten to **10 N·m (89 lb in)**.

   Note: When replacing the fan and fan motor, ensure the fan to fan motor retaining nut is replaced.

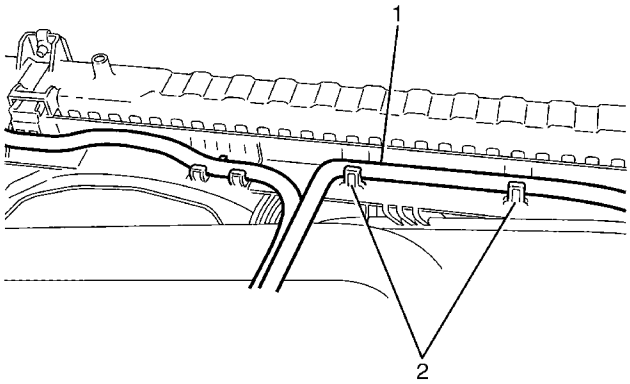
3. Install the fan (1) to the cooling fan motor (3).
4. Install the fan (1) to the fan motor (2) retaining nut (4) and tighten to **6 N·m (53 lb in)**.
5. Install the cooling fan and shroud assembly. Refer to Cooling Fan and Shroud Replacement.
6. Start and run engine until the cooling fans are activated.

Cooling Fan and Shroud Replacement

Removal Procedure

Warning: Refer to Battery Disconnect Warning in the Preface section.

1. Disconnect the battery ground cable from the battery. Refer to Battery Negative Cable Disconnection and Connection.
2. Remove the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement.
3. Remove the mass air flow sensor. Refer to Mass Airflow Sensor/Intake Air Temperature Sensor Replacement for the 3.6L engine or Mass Airflow Sensor/Intake Air Temperature Sensor Replacement for the 6.0L engine.
4. Remove the air intake duct. Refer to Air Cleaner Inlet Duct Replacement for the 3.6L engine or Air Cleaner Inlet Duct Replacement for the 6.0L engine.
5. Remove the radiator inlet hose. Refer to Radiator Inlet Hose Replacement.



6. Detach and remove the coolant recovery hose (1) from the coolant recovery hose retaining locks (2).

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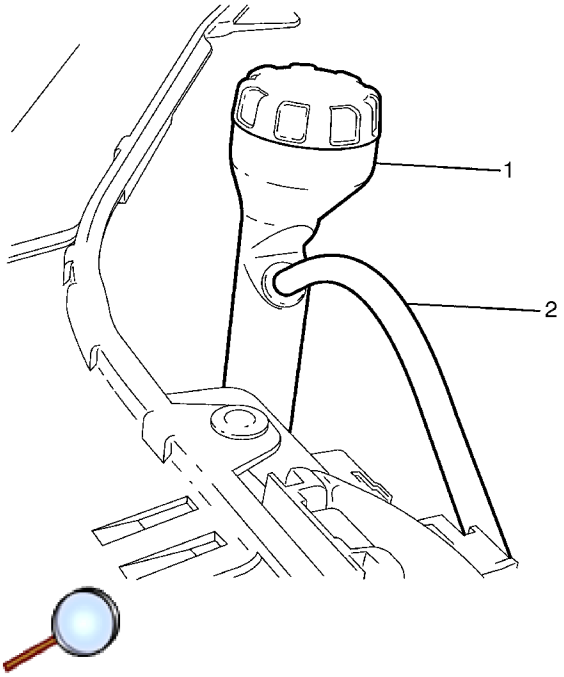
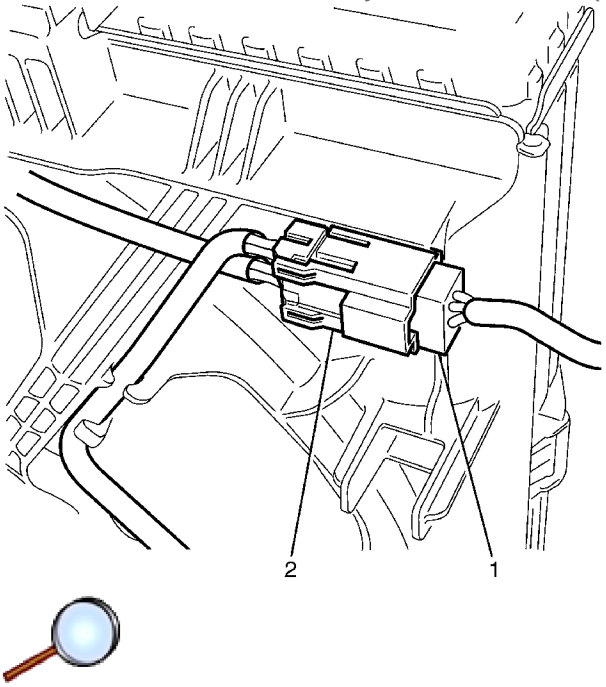


7. Detach the coolant recovery reservoir hose (2) from the coolant recovery reservoir (1).

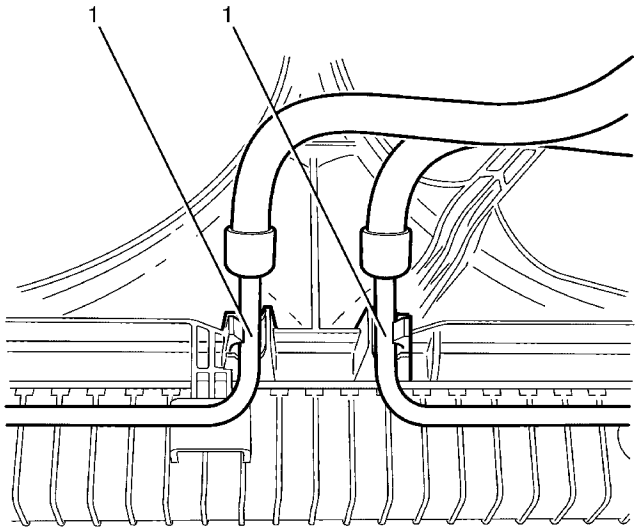


8. Detach the cooling fan motor electrical connector (2) from the main wiring harness (1).

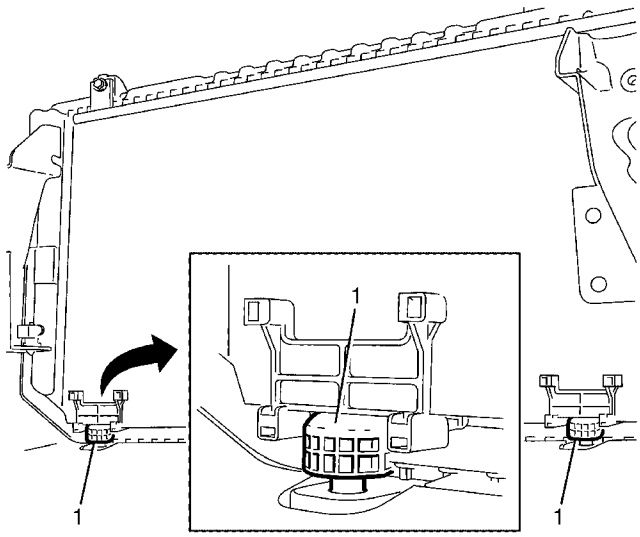
Warning: Refer to Safety Glasses Warning in the Preface section.

Danger: To avoid any vehicle damage, serious personal injury or death when major components are removed from the vehicle and the vehicle is supported by a hoist, support the vehicle with jack stands at the opposite end from which the components are being removed and strap the vehicle to the hoist.

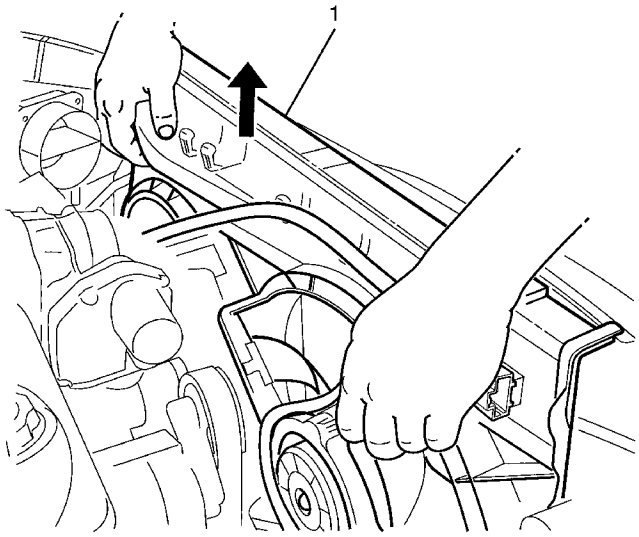
9. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.



10. Detach the transmission cooling hoses (1) from the fan shroud.
11. Lower the vehicle.



12. Remove the fan shroud (3) by pressing down on retaining lugs (1) to release it from the radiator assembly (2).

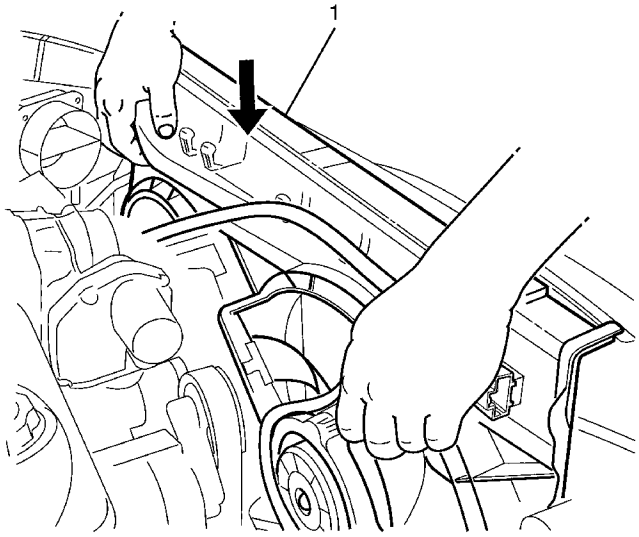


Note: When removing or installing the fan assembly always hold it by the fan motor mounting struts.

Note: Do not grasp the assembly by the fan rings as this may cause vibrations when the fans are in motion.

13. While holding the fan motor mounting struts remove the cooling fan and shroud assembly (1).

Installation Procedure

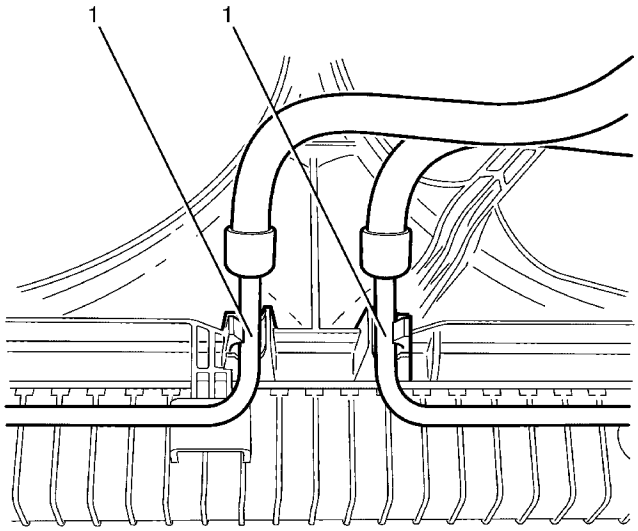


1. Install the cooling fan and shroud assembly (1).
2. Install the cooling fan and shroud assembly (1) onto the radiator (2) by pushing assembly forward until tabs lock into radiator retaining lugs. Listen for an audible click to confirm fitting.

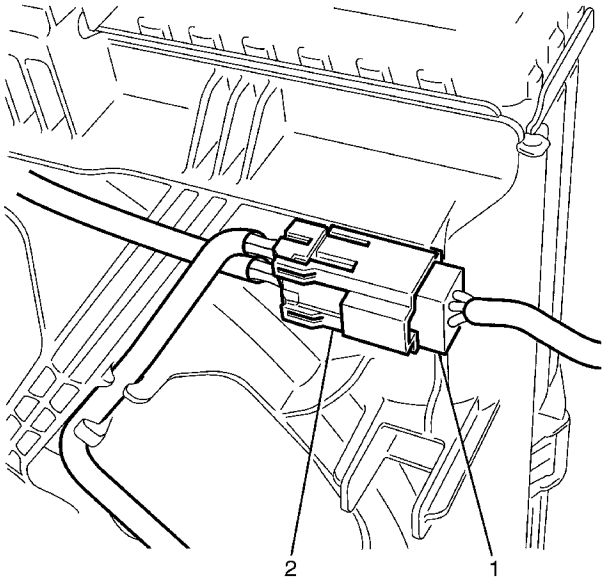
Warning: Refer to Safety Glasses Warning in the Preface section.

Danger: To avoid any vehicle damage, serious personal injury or death when major components are removed from the vehicle and the vehicle is supported by a hoist, support the vehicle with jack stands at the opposite end from which the components are being removed and strap the vehicle to the hoist.

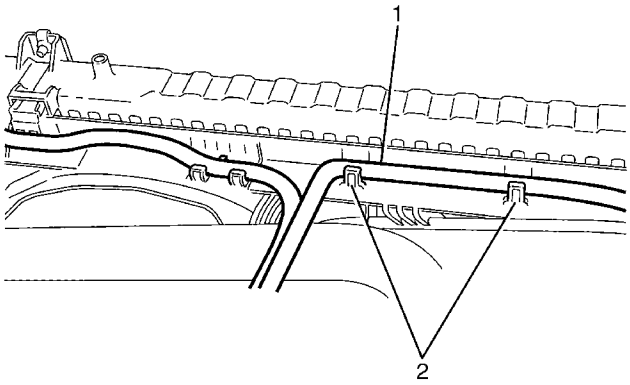
3. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.



4. Install the transmission cooling hoses (1) onto the fan assembly.



5. Attach the cooling fan electrical connector (2) to the main wiring harness (1).



6. Attach the coolant recovery hose (1) into the coolant recovery hose retaining locks (2).
7. Install the radiator inlet hose. Refer to Radiator Inlet Hose Replacement.
8. Install the air intake duct. Refer to Air Cleaner Inlet Duct Replacement for the 3.6L engine or Air Cleaner Inlet Duct Replacement for the 6.0L engine.
9. Install the MAF sensor. Refer to Mass Airflow Sensor/Intake Air Temperature Sensor Replacement for the 3.6L engine or Mass Airflow Sensor/Intake Air Temperature Sensor Replacement for the 6.0L engine.
10. Install the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement.
11. Connect the battery ground lead to the vehicle. Refer to Battery Negative Cable Disconnection and Connection.
12. Start and run engine until the cooling fans are activated.

Engine Coolant Thermostat Housing Replacement

Removal Procedure

Warning: Refer to Battery Disconnect Warning in the Preface section.

Note: Refer to Battery Negative Cable Disconnection and Connection.

1. Disconnect the battery ground cable from the battery.

Warning: Refer to Radiator Cap Removal Warning in the Preface section.

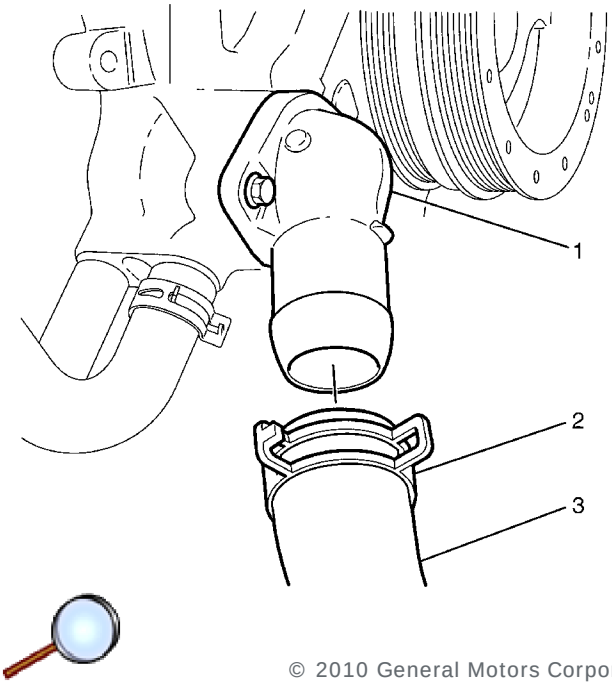
2. Ensure engine is below 50°C before removing the coolant pressure cap.
3. Remove the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement.
4. Remove the air intake duct. Refer to Air Cleaner Inlet Duct Replacement.

Warning: Refer to Safety Glasses Warning in the Preface section.

Danger: To avoid any vehicle damage, serious personal injury or death when major components are removed from the vehicle and the vehicle is supported by a hoist, support the vehicle with jack stands at the opposite end from which the components are being removed and strap the vehicle to the hoist.

5. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
6. Drain the coolant into a suitable container. Refer to Cooling System Draining and Filling.
7. Lower the vehicle.

Warning: Refer to Safety Glasses Warning in the Preface section.



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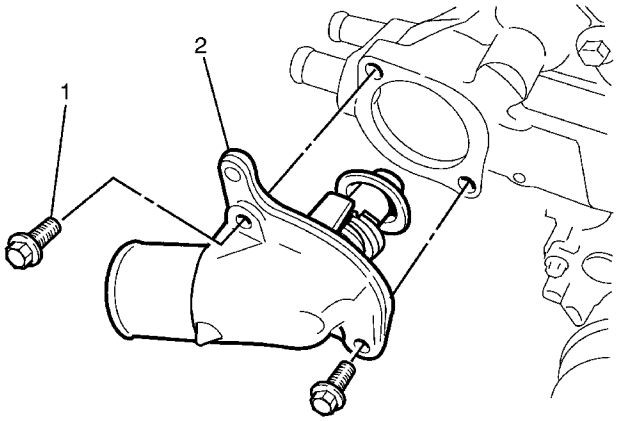
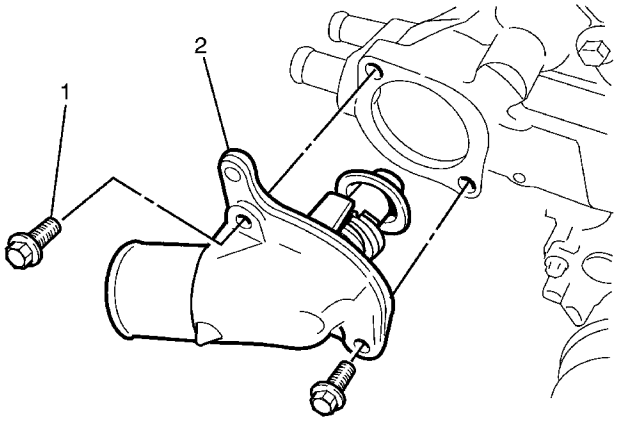
8. Release the retaining hose clamp (2) and detach the hose (3) from the thermostat housing end (1).



9. Remove the thermostat housing (2) to water pump retaining bolts (1), and remove thermostat housing.
10. If the housing is to be replaced, discard the O-ring.

Installation Procedure

1. Install thermostat. Refer to Engine Coolant Thermostat Replacement.
2. Ensure all mating surfaces are thoroughly cleaned, using only a fine abrasive material.



Note: Ensure a new O-ring seal is used.

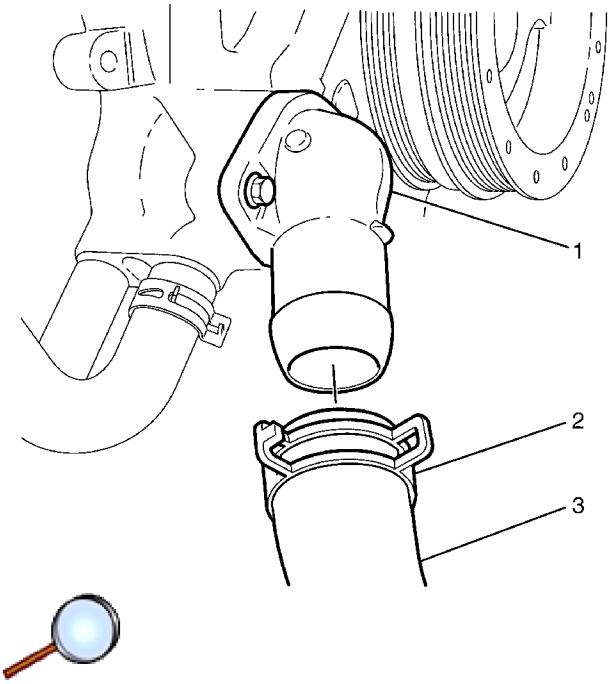
3. Install the thermostat housing (2).

   Caution: Refer to Fastener Caution in the Preface section.

4. Install the thermostat housing to water pump retaining bolts (1) and tighten to **14 N·m (124 lb in)**.

   Warning: Refer to Safety Glasses Warning in the Preface section.

   Caution: Refer to Installing Hoses without Twists or Bends Caution in the Preface section.

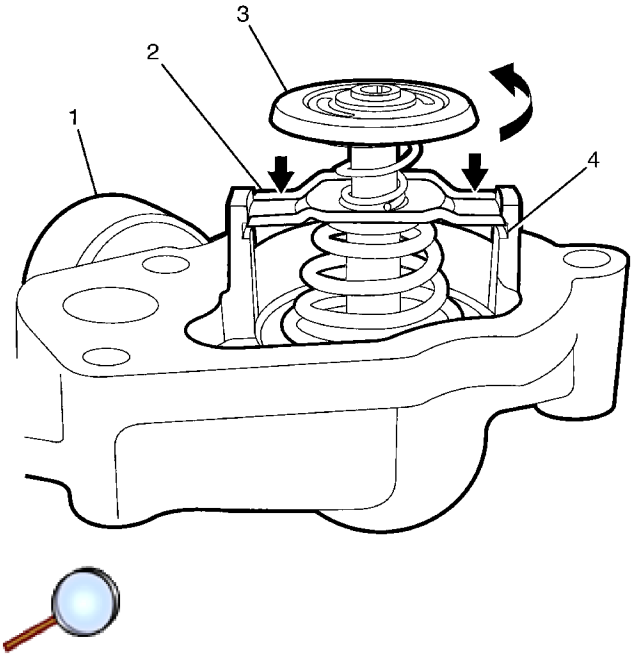


5. Install the hose (3) to the thermostat housing (1) by opening the retaining hose clamp (2) and securing it over the hose.
6. Install the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement.
7. Install the air intake duct. Refer to Air Cleaner Inlet Duct Replacement.
8. Fill the cooling system. Refer to Cooling System Draining and Filling.
9. Connect the battery ground cable to the battery. Refer to Battery Negative Cable Disconnection and Connection.
10. Inspect cooling system for leaks.

Engine Coolant Thermostat Replacement (3.6L)

Removal Procedure

1. Remove the thermostat housing. Refer to Engine Coolant Thermostat Housing Replacement.



2. Place thermostat housing in a soft jaw vice.

   Warning: Refer to Safety Glasses Warning in the Preface section.

3. While depressing the thermostat (3), rotate the retaining bar (2) counterclockwise in the housing (1) until it clears the retaining lugs (4).
4. Carefully release the thermostat spring force.
5. Remove the thermostat from it's housing.

Installation Procedure

1. Ensure that the thermostat housing in clean and free of damage.

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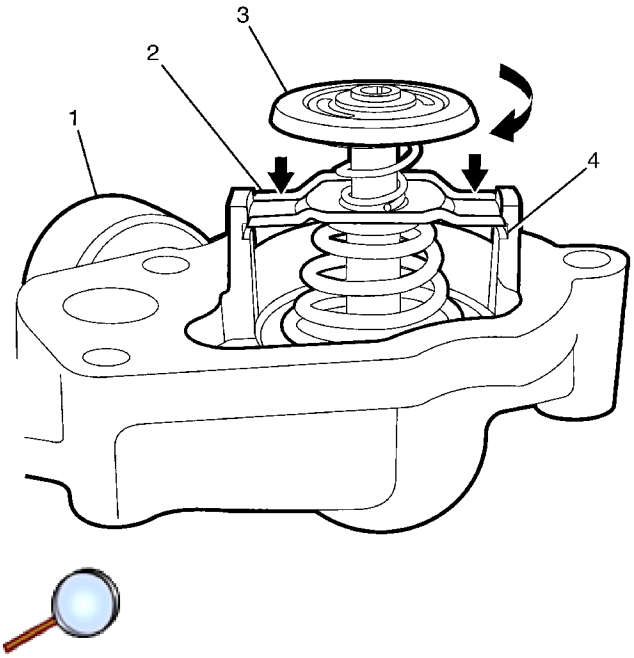


2. While pressing the thermostat (3), rotate the retaining bar (2) clockwise in the housing (1) until it locks into the retaining lugs (4).
3. Install the thermostat housing. Refer to Engine Coolant Thermostat Housing Replacement.

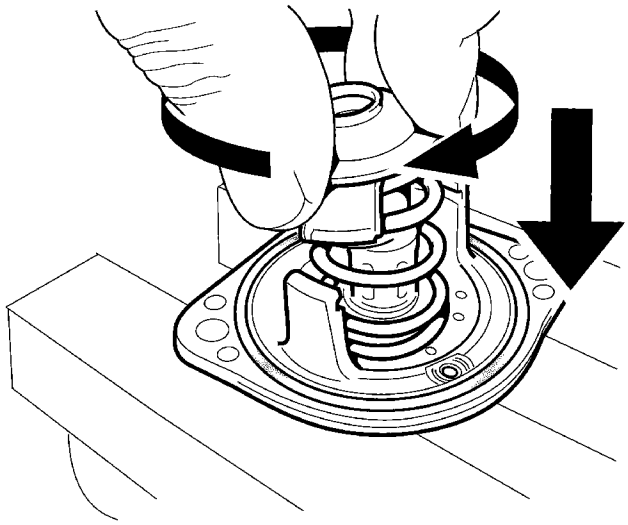
Engine Coolant Thermostat Replacement (6.0L)

Removal Procedure

Note: The thermostat and thermostat housing are serviced as a complete assembly, they should only be separated if back flush is to be carried out.

1. Remove the thermostat housing. Refer to Engine Coolant Thermostat Housing Replacement.
2. Place thermostat housing in a soft jaw vice.

Warning: Refer to Safety Glasses Warning in the Preface section.



3. Press and rotate the springs of the thermostat to release it from the thermostat housing.
4. Remove the thermostat from the thermostat housing.

Installation Procedure

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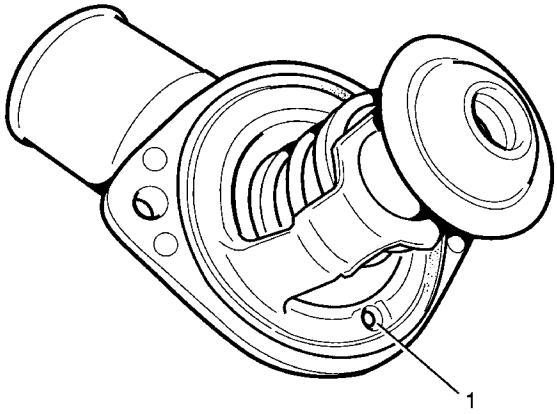
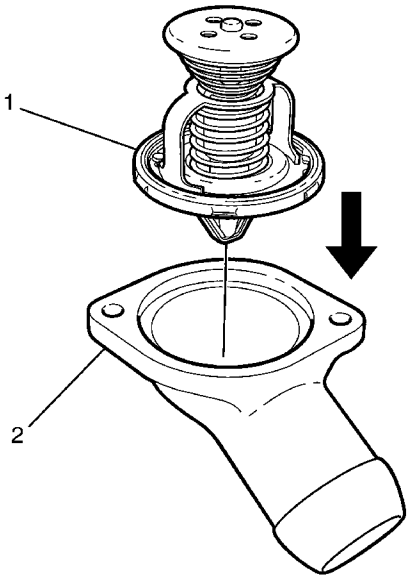


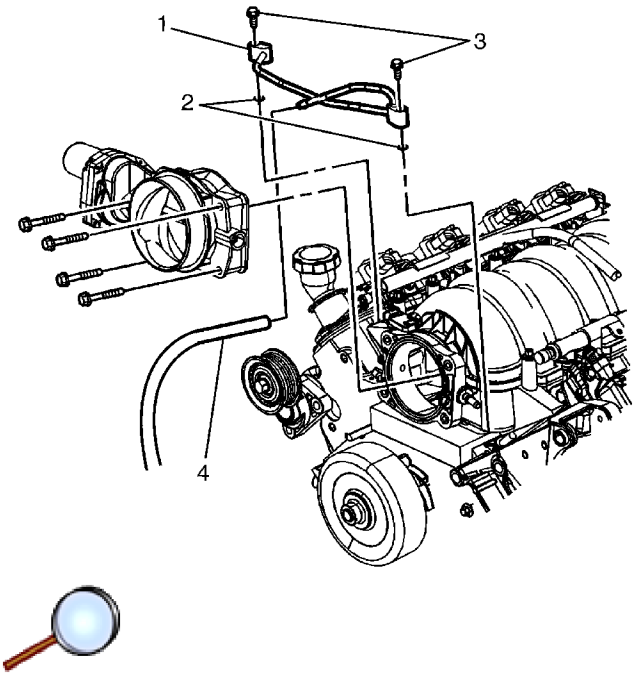
1. Assure that the air bleed ball (1) is not jammed by slightly shaking the assembly.



2. Place the thermostat (1) assembly into the thermostat housing (2).
3. Install the thermostat by rotating and locking it into the thermostat housing.

Engine Coolant Air Bleed Pipe Replacement

Removal Procedure



Note: Removal of the intake manifold is NOT required to service the coolant air bleed pipe, but is required to service the coolant air bleed pipe covers and/or gaskets.

1. Drain a gallon of coolant. Refer to Cooling System Draining and Filling.
2. Remove the throttle air body assembly. Refer to Throttle Body Assembly Replacement.
3. Remove the coolant air bleed hose (4).
4. Remove the coolant air bleed pipe mounting bolts (3).
5. Remove the coolant air bleed pipe (1) and O-rings (2).

Installation Procedure

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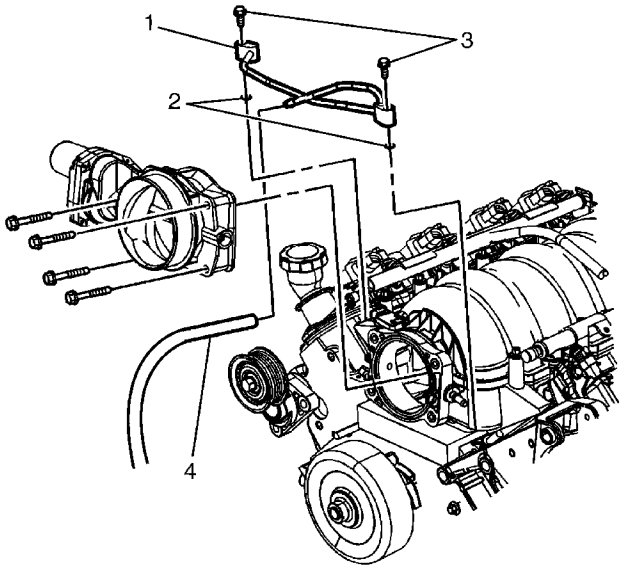


1. Position the coolant air bleed pipe (1) and O-rings (2) on the cylinder heads.

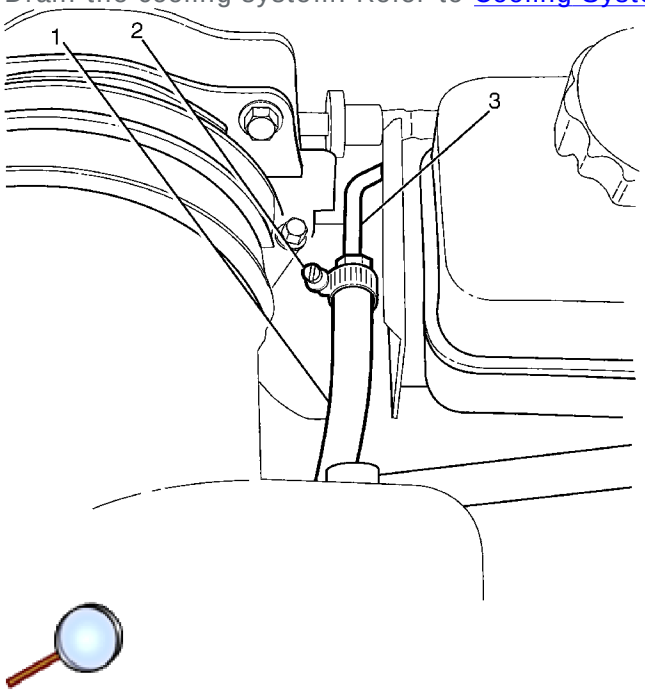
   Caution: Refer to Fastener Caution in the Preface section.

2. Install the mounting bolts (3) for the coolant air bleed pipe (1) and tighten to **12 N·m (106 lb in)**.
3. Install the coolant air bleed hose (4).
4. Install the throttle air body assembly. Refer to Throttle Body Assembly Replacement.
5. Fill the cooling system. Refer to Cooling System Draining and Filling.

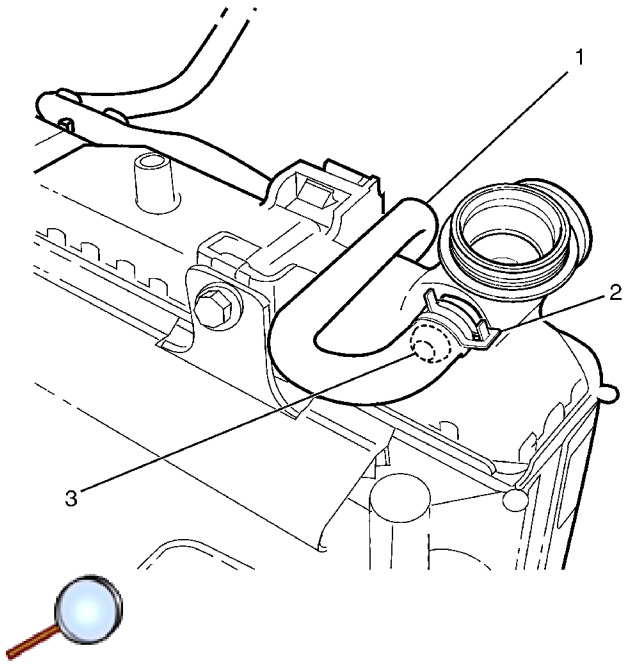
Engine Coolant Air Bleed Hose Replacement (6.0L)

Removal Procedure

1. Remove the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement in Body Front End.
2. Drain the cooling system. Refer to Cooling System Draining and Filling.



3. Release the coolant air bleed hose retaining clamp (2) and remove the coolant air bleed hose (1) from the coolant air bleed pipe (3).



4. Release the retaining hose clamp (2) on the coolant air bleed hose (1) and remove it from the radiator spigot (3).

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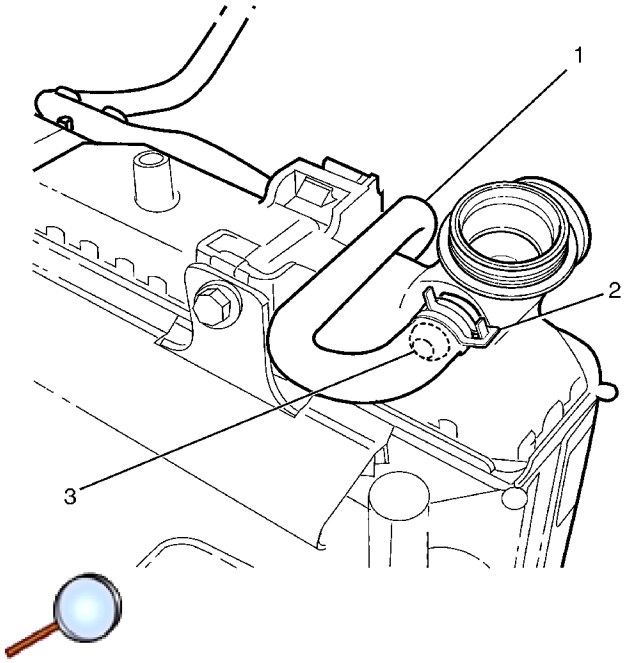
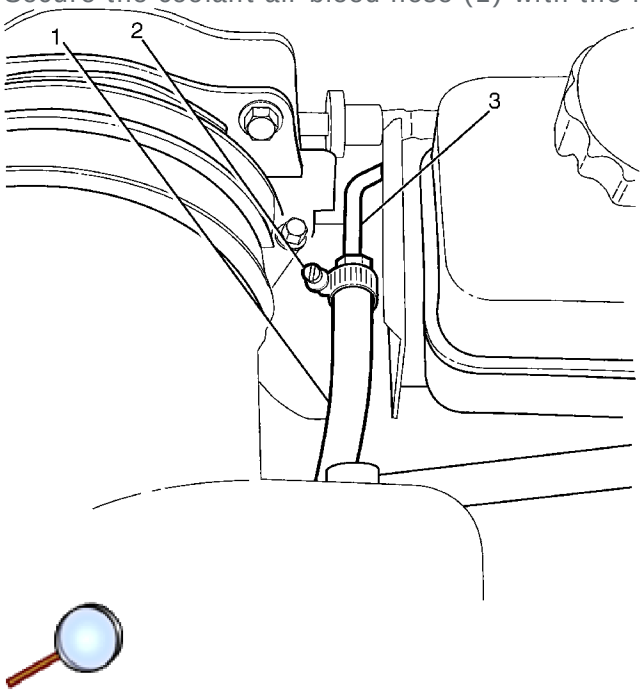
Installation Procedure



1. Attach the coolant air bleed hose (1) to the radiator spigot (3)
2. Secure the coolant air bleed hose (1) with the retaining hose clamp (2)



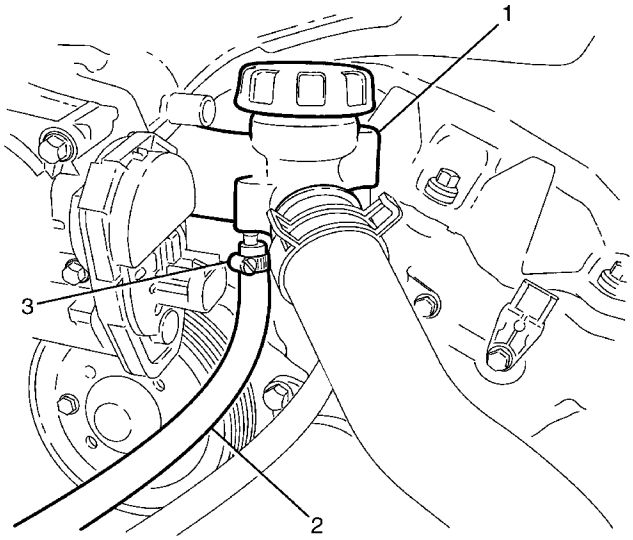
3. Attach and secure coolant air bleed hose (1) to the coolant air bleed pipe (3) and secure with the retaining hose clamp (2).
4. Fill the cooling system. Refer to Cooling System Draining and Filling.
5. Install the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement in Body Front End.

Engine Coolant Air Bleed Hose Replacement (3.6L)

Removal Procedure

1. Remove the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement.
2. Remove the air intake duct. Refer to Air Cleaner Inlet Duct Replacement.

Warning: Refer to Safety Glasses Warning in the Preface section.



3. Release the hose clamp (3) and remove the coolant air bleed hose (2) from the outlet housing (1).

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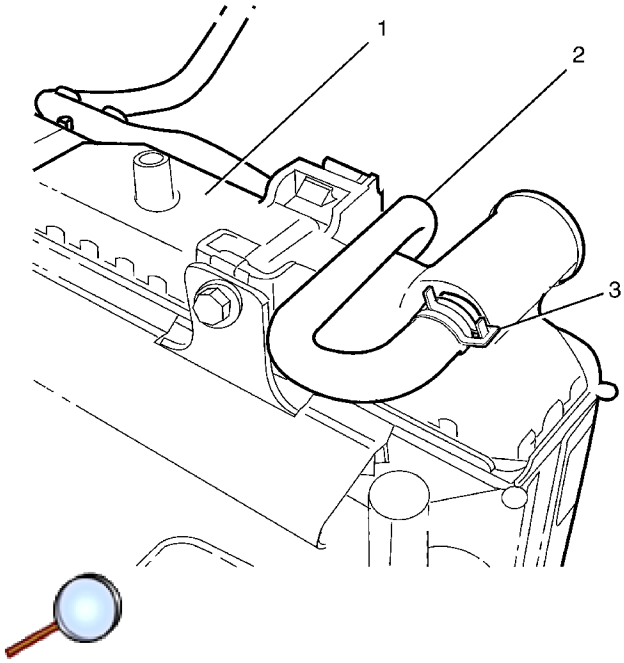
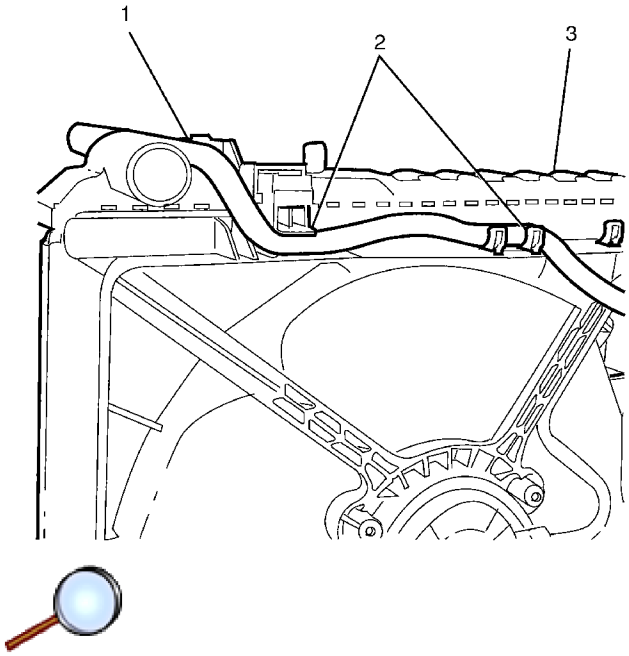
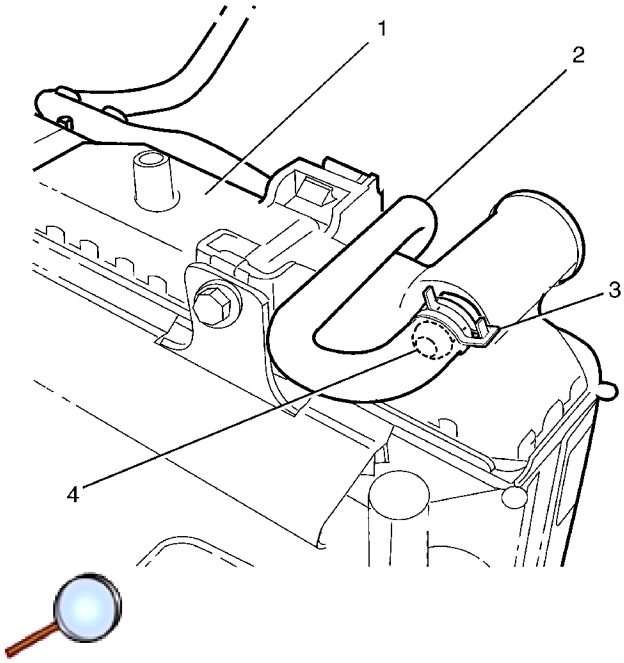


4. Release the hose clamp (3) and remove the coolant air bleed hose (2) from the radiator (1).

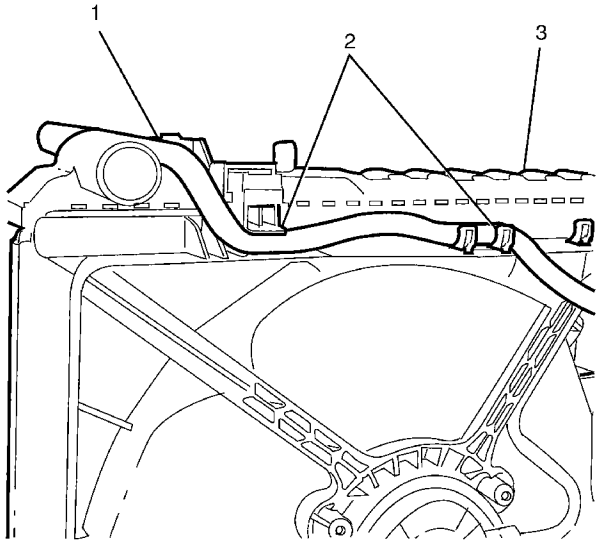


5. Detach and remove the coolant air bleed hose (1) from coolant air bleed hose retaining clips (2) located on the radiator (3).

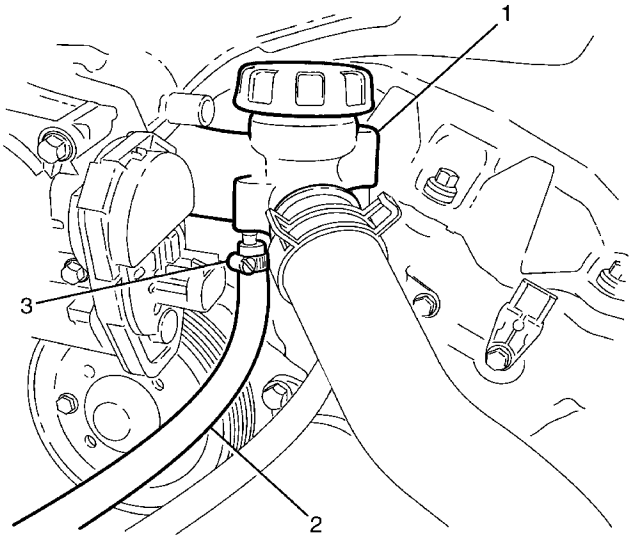
Installation Procedure



1. Install the air bleed hose (2) onto the radiator (1) spigot (4) and secure with the coolant air bleed hose clamp (3).



2. Attach the coolant air bleed hose (1) into the retaining clips (2) located on the radiator (3).

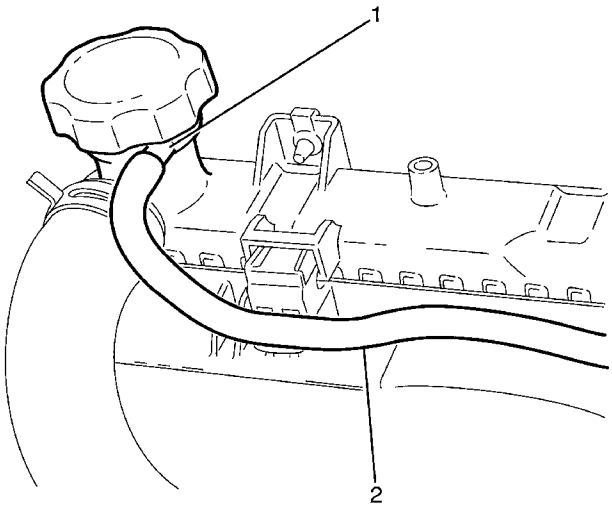


3. Install the coolant air bleed hose (2) onto the outlet housing (1) and secure with hose clamp (3).
4. Install the air intake duct. Refer to Air Cleaner Inlet Duct Replacement.
5. Install the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement.
6. Check the coolant level. Refer to Cooling System Draining and Filling.

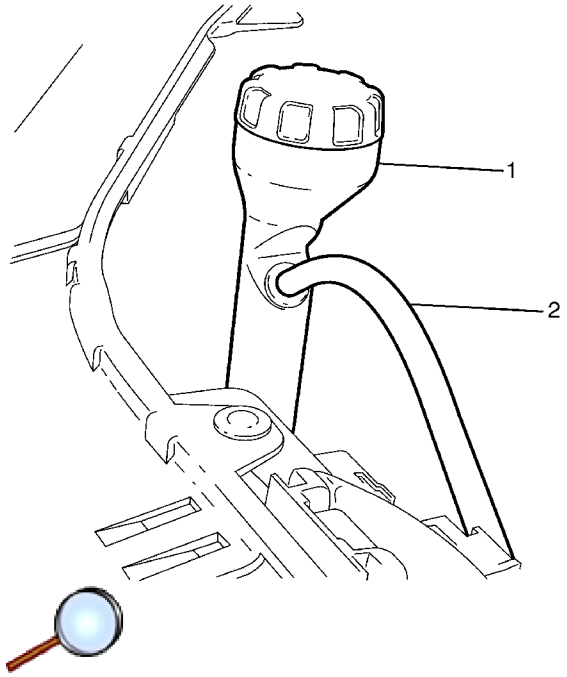
Coolant Recovery Reservoir Pipe Replacement (3.6L Engine)

Removal Procedure

1. Remove the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement in Body Front End.



2. Detach the coolant recovery hose (2) from the radiator outlet pipe (1).



3. Remove the coolant recovery hose (2) from the coolant recovery reservoir filler neck (1).

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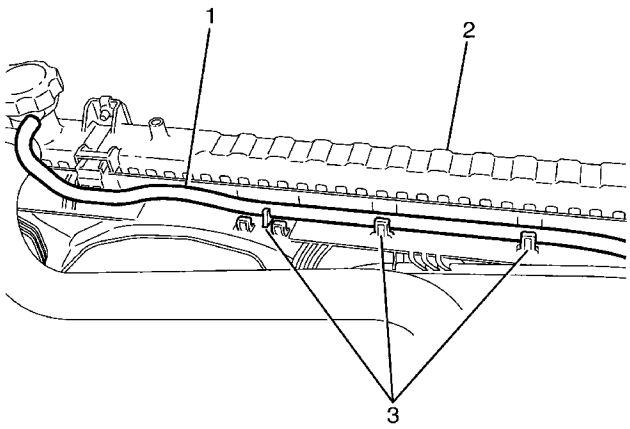
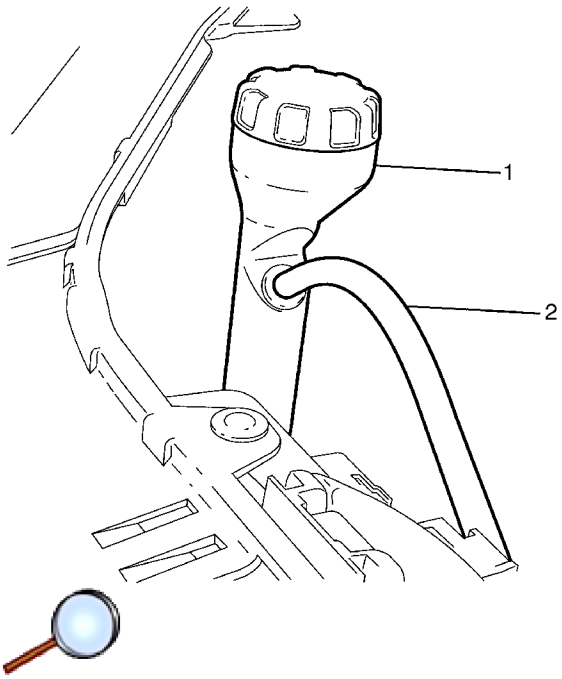
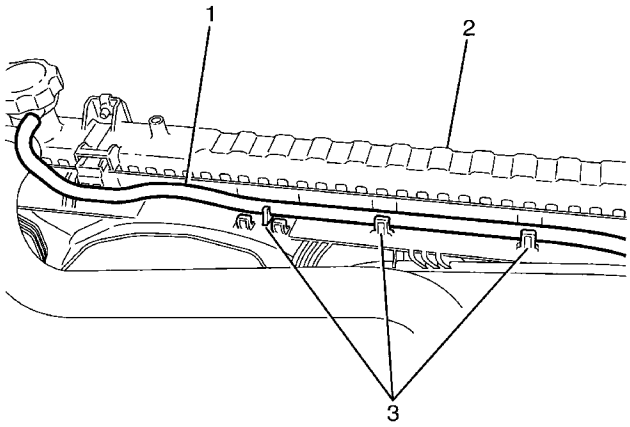


4. Detach and remove the coolant recovery reservoir hose (1) from the coolant recovery reservoir retaining locks (3) located on the radiator (2).

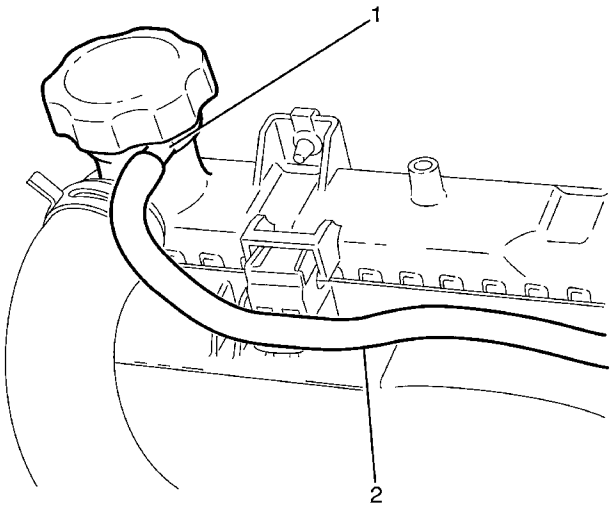
Installation Procedure



1. Install the coolant recovery reservoir hose (2) into the coolant recovery reservoir filler neck (1).



2. Attach the coolant recovery reservoir hose (1) into the coolant recovery reservoir retaining locks (3) located on the radiator (2).

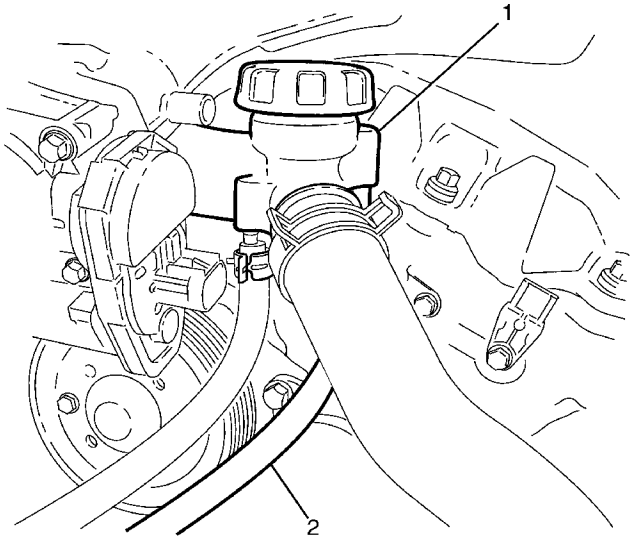


3. Attach the coolant recovery reservoir hose (2) to the radiator outlet pipe (1).
4. Install the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement in Body Front End.
5. Check the coolant level. Refer to Cooling System Draining and Filling.

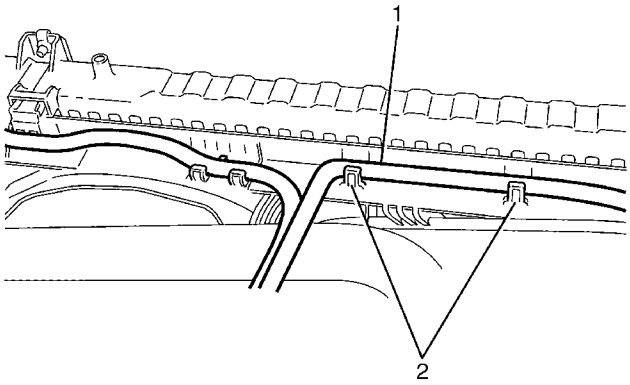
Coolant Recovery Reservoir Pipe Replacement (6.0L Engine)

Removal Procedure

1. Remove the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement in Body Front End.
2. Remove the air intake duct. Refer to Air Cleaner Inlet Duct Replacement.



3. Detach the coolant recovery hose from the outlet housing (1).



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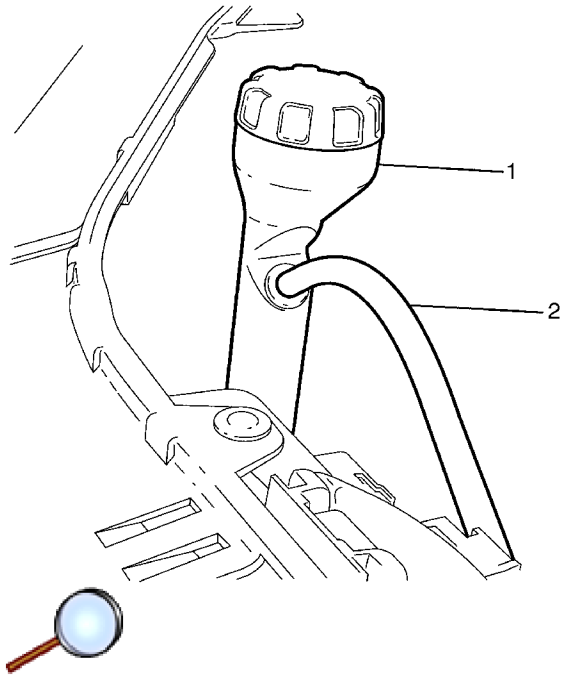
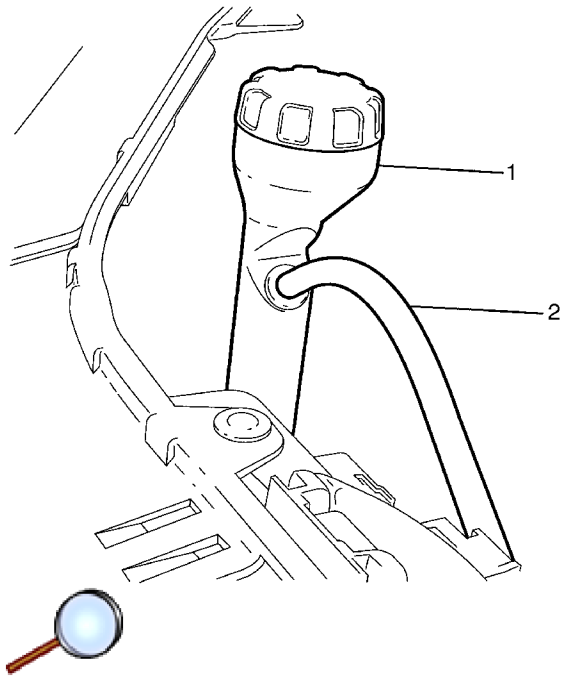
4. Detach the coolant recovery reservoir hose (1) from the radiator retaining clips (2).

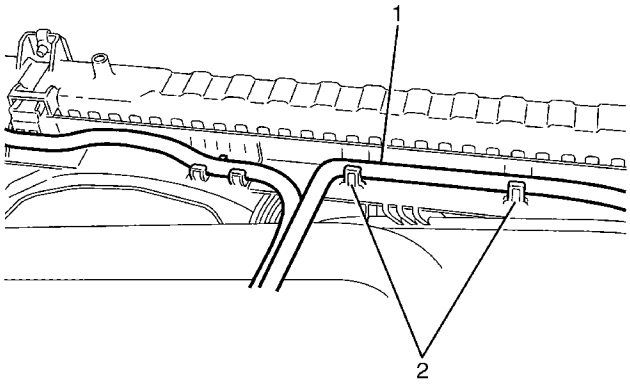


5. Detach and remove the coolant recovery hose (2) from the coolant recovery reservoir filler neck (1).

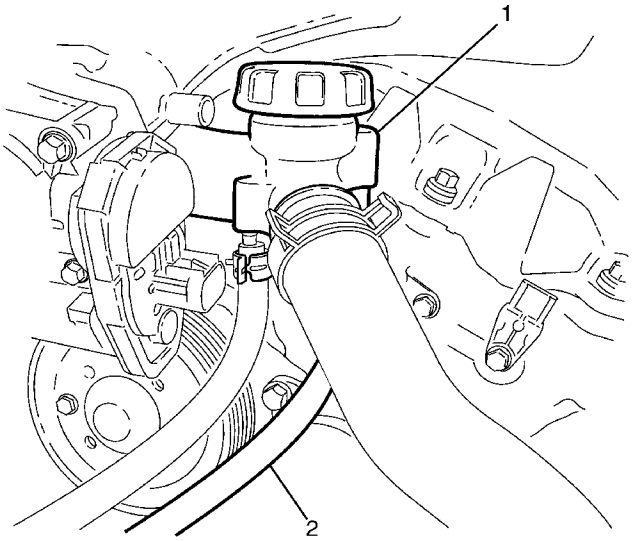
Installation Procedure



1. Attach the coolant recovery hose (2) to the coolant recovery reservoir filler neck (1).



2. Attach the coolant recovery reservoir hose (1) into the radiator (2) retaining clips (3).



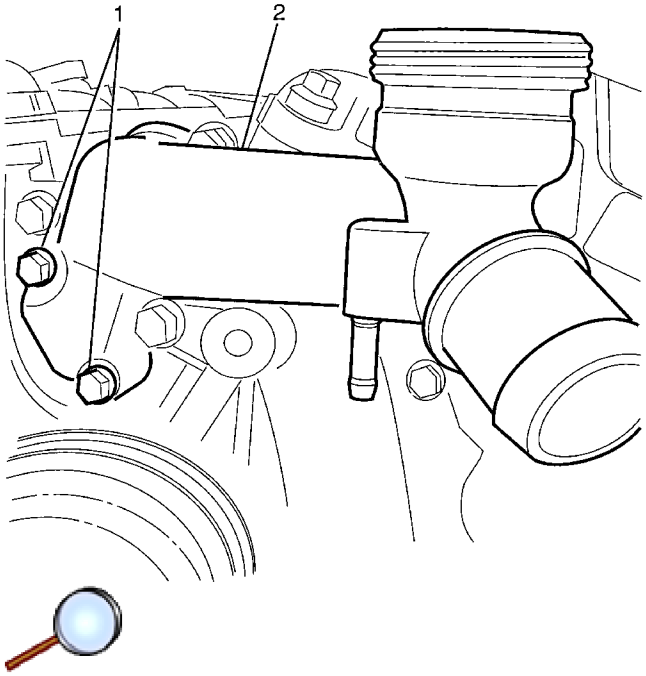
3. Attach the coolant recovery hose (2) to the outlet housing (1).
4. Inspect the coolant level and "top up" if necessary.
5. Install the air intake duct. Refer to Air Cleaner Inlet Duct Replacement.
6. Install the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement in Body Front End.

Water Outlet Replacement

Removal Procedure

Warning: Refer to Battery Disconnect Warning in the Preface section.

1. Disconnect the battery ground cable from the battery. Refer to Battery Negative Cable Disconnection and Connection.
2. Drain the cooling system. Refer to Cooling System Draining and Filling.
3. Remove the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement.
4. Remove the air intake duct. Refer to Air Cleaner Inlet Duct Replacement.
5. Remove the intake manifold. Refer to Intake Manifold Removal.
6. Detach the radiator inlet hose. Refer to Radiator Inlet Hose Replacement.
7. Detach the coolant recovery reservoir hose. Refer to Coolant Recovery Reservoir Replacement.
8. Detach the coolant air bleed hose. Refer to Engine Coolant Air Bleed Hose Replacement.



Note: If required, use of a soft pain hammer to aid in the removal of the water outlet housing.

9. Remove the water outlet housing (2) to intake manifold retaining bolts (1).
10. Remove the water outlet housing.
11. Discard the rubber O-ring and seal.

Installation Procedure

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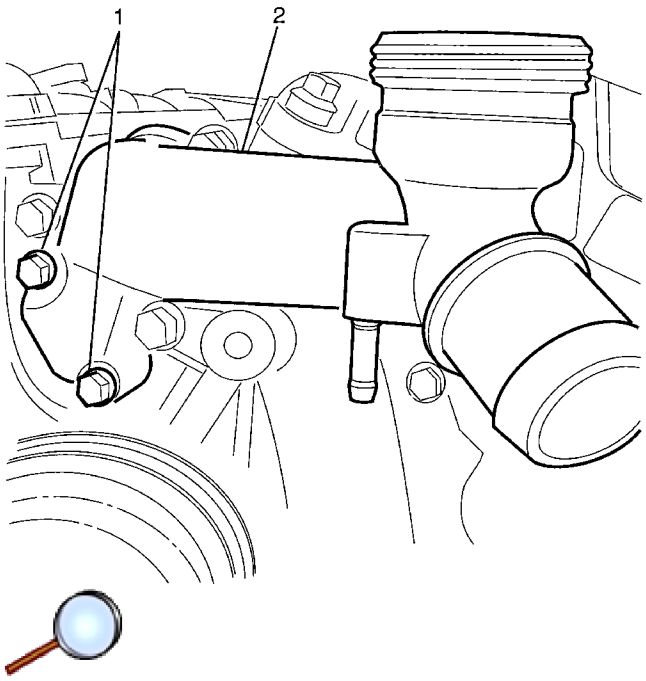


Note: Ensure a new rubber O-ring and seal is used when installing the water outlet housing.

1. Install the water outlet housing (2) to the intake manifold.

Caution: Refer to Fastener Caution in the Preface section.

2. Install the water outlet housing (2) to intake manifold retaining bolts (1) and tighten to **10 N·m (89 lb in)**.
3. Attach the coolant air bleed hose. Refer to Engine Coolant Air Bleed Hose Replacement.
4. Attach the coolant recovery reservoir hose. Refer to Coolant Recovery Reservoir Replacement.
5. Attach the radiator inlet hose. Refer to Radiator Inlet Hose Replacement.
6. Install the intake manifold. Refer to Intake Manifold Removal.
7. Install the air intake duct. Refer to Air Cleaner Inlet Duct Replacement.
8. Install the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement.
9. Connect the battery ground cable to the battery. Refer to Battery Negative Cable Disconnection and Connection.
10. Fill the cooling system. Refer to Cooling System Draining and Filling.
11. Inspect cooling system for leaks.

Water Pump Replacement (3.6L)

Removal Procedure

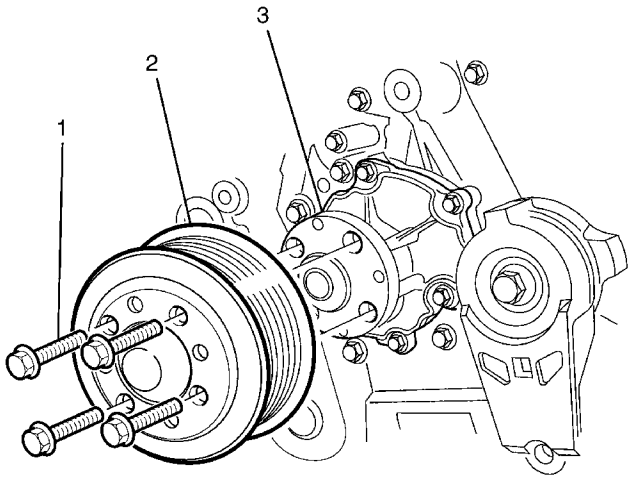
Warning: Refer to Battery Disconnect Warning in the Preface section.

1. Disconnect the battery ground cable from the battery. Refer to Battery Negative Cable Disconnection and Connection.
2. Drain the cooling system. Refer to Cooling System Draining and Filling.
3. Remove the engine cover. Refer to Engine Cover Replacement.
4. Remove the air intake duct. Refer to Air Cleaner Inlet Duct Replacement.
5. Remove the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement.
6. Remove the engine drive belt. Refer to Drive Belt Replacement.

Warning: Refer to Safety Glasses Warning in the Preface section.

Warning: Refer to Radiator Cap Removal Warning in the Preface section.

7. Ensure engine is below 50°C before removing the coolant pressure cap.



8. Remove the water pump pulley to water pump retaining bolts (1).
9. Remove the water pump pulley (2) from the water pump (3).

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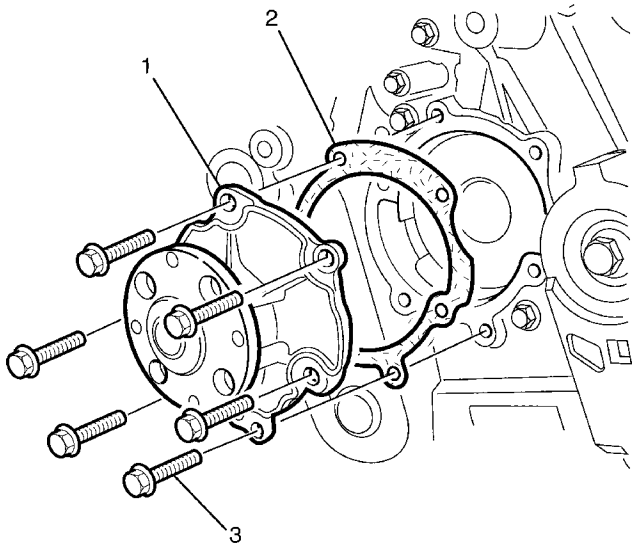


Note: Use a soft hammer to separate the water pump from the engine cover.

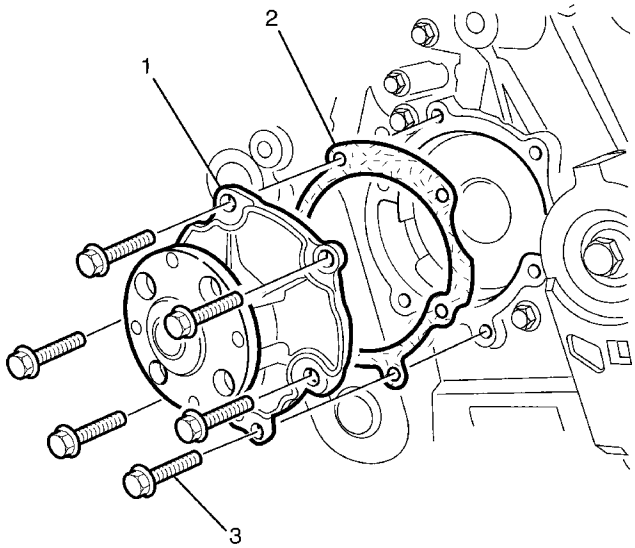
10. Remove the water pump to engine front cover retaining bolts (3).
11. Remove the water pump (1).
12. Remove the water pump gasket (2).

Discard the gasket.

Installation Procedure

Note: Make sure all mating surfaces are clean and free of grease.

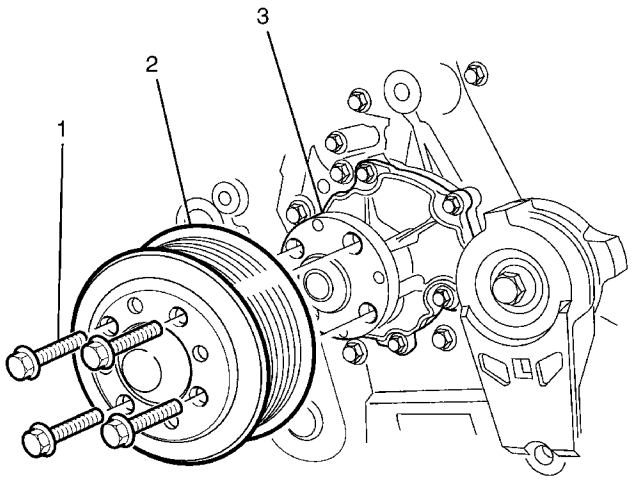
1. Using a water sealant install the water pump and gasket to front engine cover.
2. Make sure all retaining bolts are clean and free of debris.



3. Install the water pump (1) and NEW gasket (2).

Caution: Refer to Fastener Caution in the Preface section.

4. Install the water pump to engine front cover retaining bolts (3) and tighten to **10 N·m (89 lb in)**.



5. Install the water pump pulley (2) to the water pump (3)
6. Install the water pump pulley to water pump retaining bolts (1) and tighten to **10 N·m (89 lb in)**.
7. Install the drive belt. Refer to Drive Belt Replacement.
8. Install the air intake duct. Refer to Air Cleaner Inlet Duct Replacement.
9. Install the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement.
10. Install the engine cover. Refer to Engine Cover Replacement.
11. Connect the battery ground cable to the battery. Refer to Battery Negative Cable Disconnection and Connection.
12. Fill cooling system. Refer to Cooling System Draining and Filling.
13. Start engine and check for leaks.

Water Pump Replacement (6.0L)

Removal Procedure

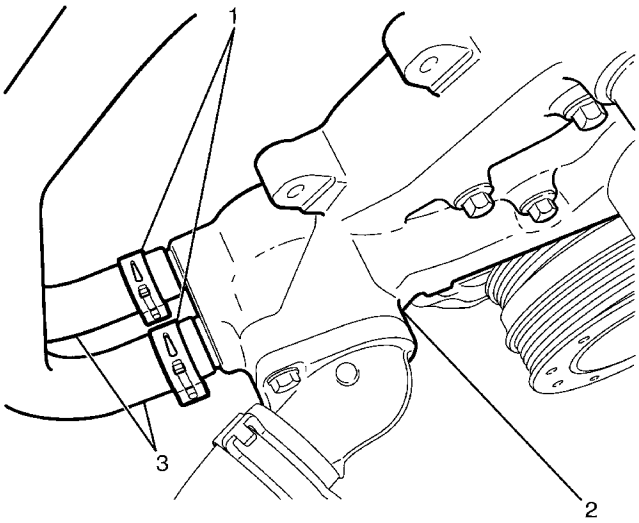
Warning: Refer to Battery Disconnect Warning in the Preface section.

Note: The water pump is not a serviceable item and should be replaced as an assembly.

1. Disconnect the battery ground cable from the battery. Refer to Battery Negative Cable Disconnection and Connection.
2. Drain the cooling system. Refer to Cooling System Draining and Filling.
3. Remove the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement.
4. Remove the air intake duct. Refer to Air Cleaner Inlet Duct Replacement.
5. Remove the engine drive belt. Refer to Drive Belt Replacement - Accessory.

Warning: Refer to Radiator Cap Removal Warning in the Preface section.

6. Remove the coolant pressure cap.
7. Detach the inlet hose. Refer to Radiator Inlet Hose Replacement.
8. Detach the outlet hose. Refer to Radiator Outlet Hose Replacement.



9. Detach the heater hoses (1) from the water pump (2).
10. Remove drive belt tensioner. Refer to Drive Belt Tensioner Replacement - Accessory.

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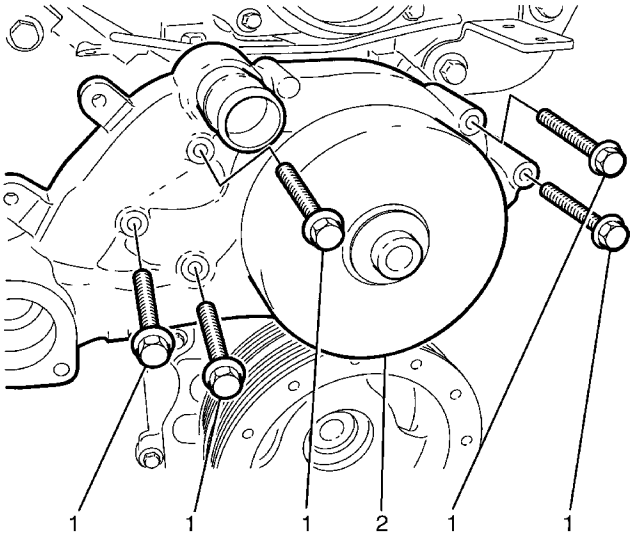
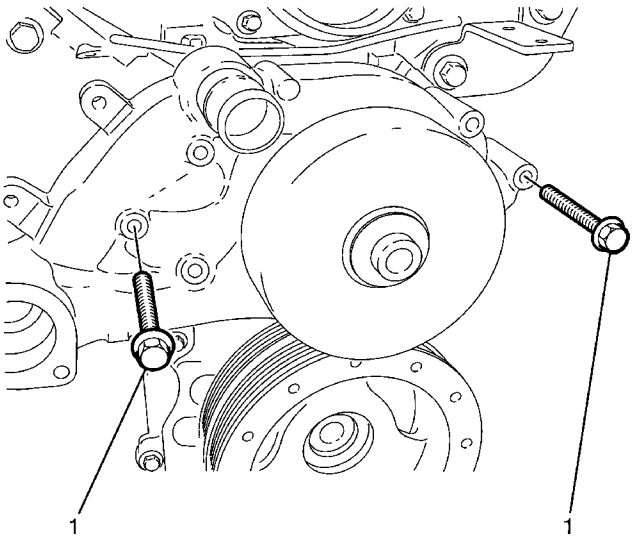


11. Remove the water pump (2) retaining bolts (1).

Note: Use of a soft hammer will aid in the removal of the water pump.

12. Remove the water pump.

Installation Procedure

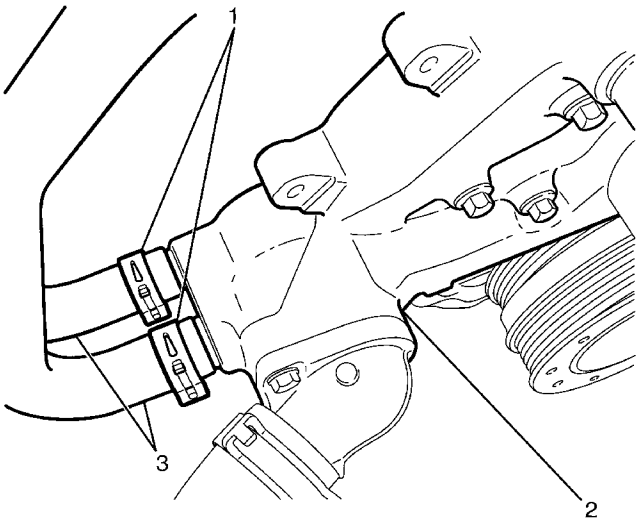


Note: Ensure all mating surfaces are clean and free of grease.

1. Insert 2 retaining bolts (1) at each end of the pump, place the new gasket of the bolts and use this as a guide to install the pump.

   Caution: Refer to Fastener Caution in the Preface section.

2. Install and tighten the remaining bolts a first pass to **15 N·m (11 lb ft)**. Tighten the bolts at final pass to **25 N·m (18 lb ft)**.
3. Install drive belt tensioner. Refer to Drive Belt Tensioner Replacement - Accessory.
4. Install the outlet hose to the water pump. Refer to Radiator Outlet Hose Replacement.
5. Install the inlet hose to the water pump. Refer to Radiator Inlet Hose Replacement.



6. Install the heater hoses (1) to the water pump (2).
7. Install the engine drive belt. Refer to Drive Belt Replacement - Accessory.
8. Install the air intake duct. Refer to Air Cleaner Inlet Duct Replacement.
9. Install the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement.
10. Install the ground battery lead to the vehicle. Refer to Battery Negative Cable Disconnection and Connection.
11. Fill the cooling system. Refer to Cooling System Draining and Filling.
12. Inspect cooling system for leaks.

Radiator Drain Cock Replacement

Replacement Procedure

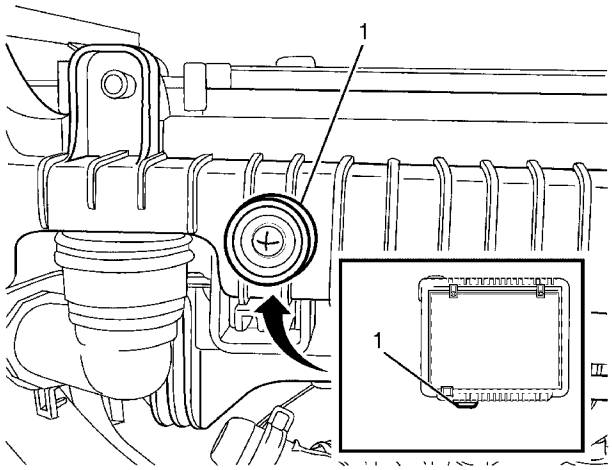
Warning: Refer to Safety Glasses Warning in the Preface section.

Warning: Refer to Radiator Cap Removal Warning in the Preface section.

1. Remove the filler cap.

Danger: To avoid any vehicle damage, serious personal injury or death when major components are removed from the vehicle and the vehicle is supported by a hoist, support the vehicle with jack stands at the opposite end from which the components are being removed and strap the vehicle to the hoist.

2. Raise and support the front of the vehicle. Refer to Lifting and Jacking the Vehicle.
3. Drain the cooling system. Refer to Cooling System Draining and Filling.



4. Remove the drain cock (1).

Installation Procedure

Caution: Refer to Fastener Caution in the Preface section.

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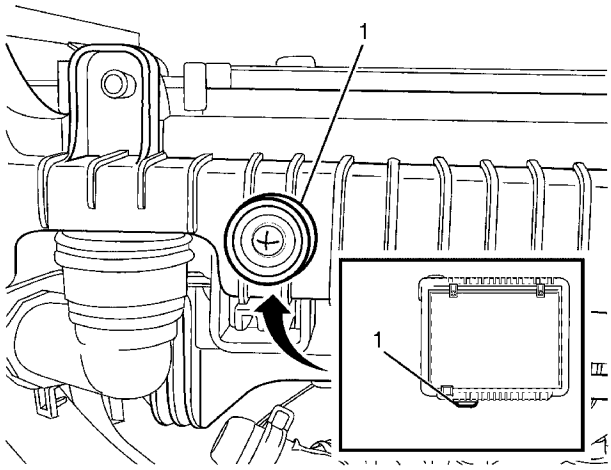

1. Install the drain cock plug (1) ensuring a new O-ring is used and tighten to **2 N·m (18 lb in)**.
2. Lower the vehicle.
3. Fill the cooling system. Refer to Cooling System Draining and Filling.
4. Inspect the cooling system for leaks.

Radiator Replacement

Special Tools

AU-525 Quick Connect Release Tool

Removal Procedure

Warning: Refer to Battery Disconnect Warning in the Preface section.

1. Disconnect the battery ground cable from the battery. Refer to Battery Negative Cable Disconnection and Connection.

Warning: Refer to Radiator Cap Removal Warning in the Preface section.

2. Ensure engine is below 50°C before removing the coolant pressure cap.
3. Drain the cooling system. Refer to Cooling System Draining and Filling.
4. Remove the engine cover. Refer to Engine Cover Replacement for the 3.6L engine or Engine Cover Replacement for the 6.0L engine.
5. Remove the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement.
6. Remove the air intake duct. Refer to Air Cleaner Inlet Duct Replacement for the 3.6L engine or Air Cleaner Inlet Duct Replacement for the 6.0L engine.
7. Remove the mass air flow meter. Refer to Mass Airflow Sensor/Intake Air Temperature Sensor Replacement for the 3.6L engine or Mass Airflow Sensor/Intake Air Temperature Sensor Replacement for the 6.0L engine.
8. Detach the radiator inlet hose. Refer to Radiator Inlet Hose Replacement.

Warning: Refer to Safety Glasses Warning in the Preface section.

Danger: To avoid any vehicle damage, serious personal injury or death when major components are removed from the vehicle and the vehicle is supported by a hoist, support the vehicle with jack stands at the opposite end from which the components are being removed and strap the vehicle to the hoist.

9. Raise and support vehicle. Refer to Lifting and Jacking the Vehicle.
10. Remove the air deflector. Refer to Front Air Deflector Replacement.
11. Detach the radiator outlet hose. Refer to Radiator Outlet Hose Replacement.
12. Lower the vehicle.
13. Detach the coolant recovery reservoir hose. Refer to Coolant Recovery Reservoir Replacement.
14. Remove the coolant air bleed hose. Refer to Engine Coolant Air Bleed Hose Replacement.
15. Place a suitable container beneath the radiator and engine.

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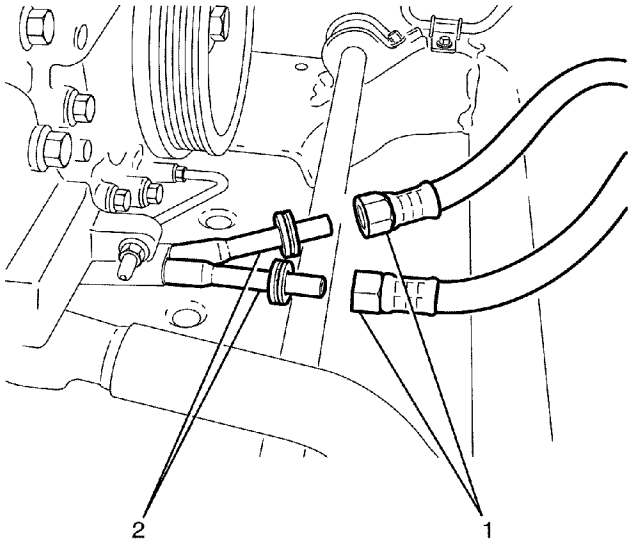
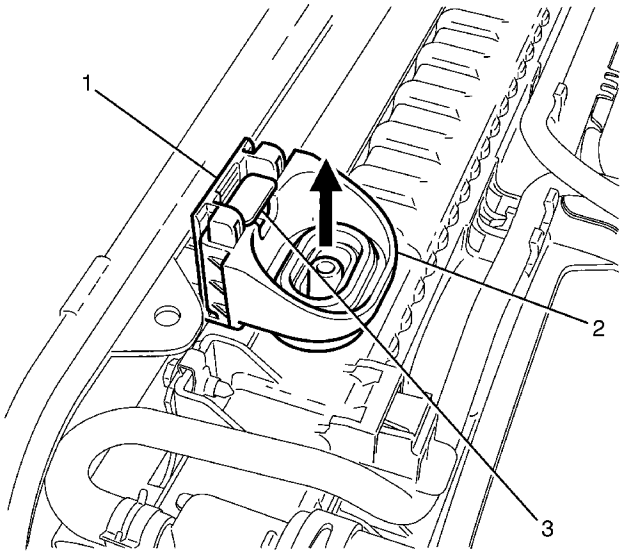


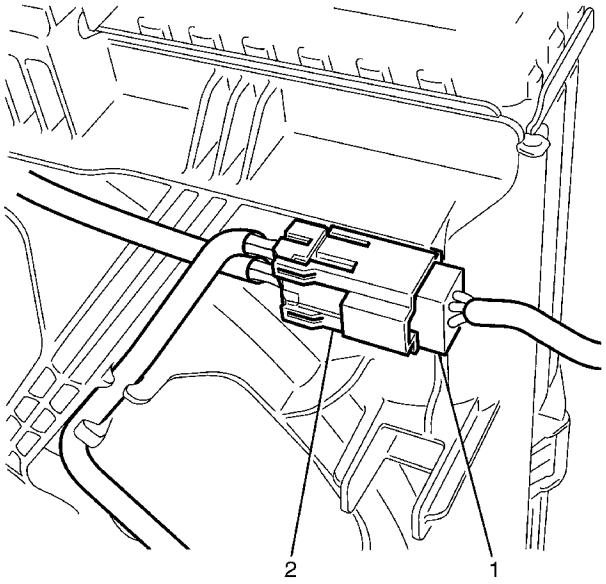
Note: When removal is complete plug hose openings with a clean lint free cloth to prevent foreign matter entry.

16. Disconnect the transmission cooler line (2) from the flexible hose (1) using the AU-525 .
    - Detach plastic cover from hose fitting and slide along pipe.
    - Open the AU-525 then close and clip around the hose to be disconnected.
    - While holding the flexible hose (1) push the hose inwards with one hand, then pull back to separate from the steel hose piping (2).
    - Repeat procedure for the second fitting.

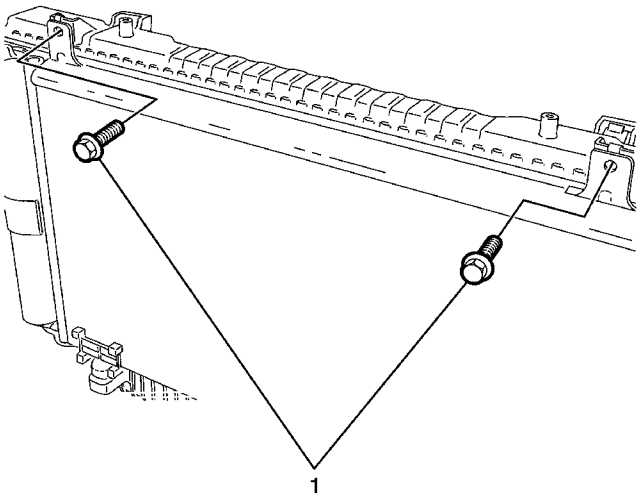


17. Remove the radiator support brackets (2) from top of radiator by rasing the securing lock (3)

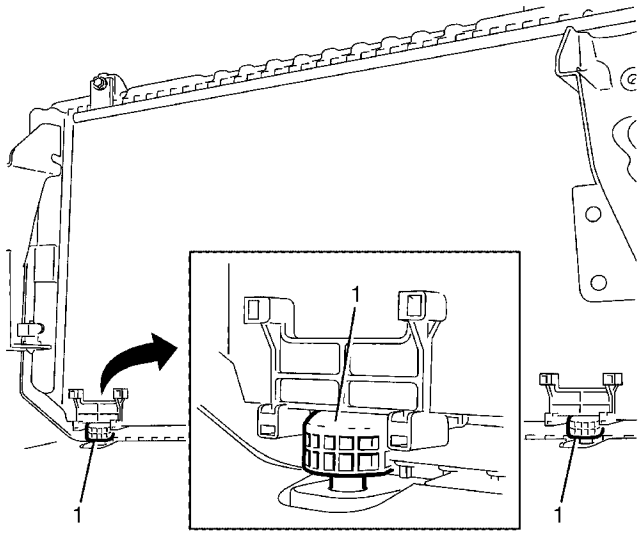
10 mm and then sliding the bracket off the radiator slide pin (1). Carry out same procedure for other bracket.



18. Disconnect the cooling fans electrical connector (2) from the main wiring loom connector (1).

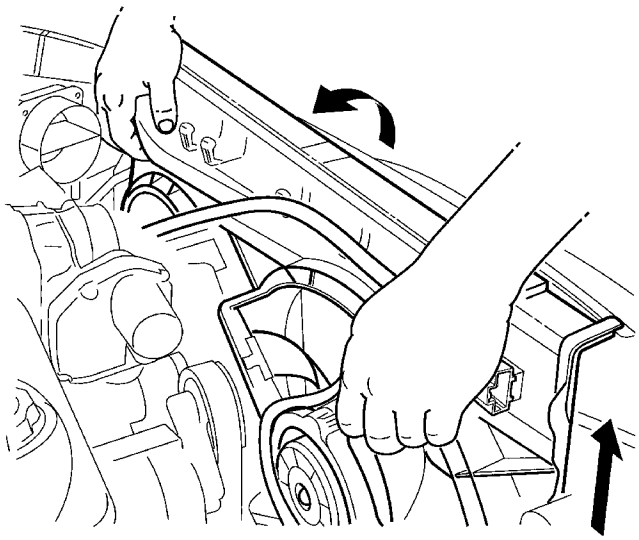


19. Remove the two radiator and condenser retaining bolts (1).



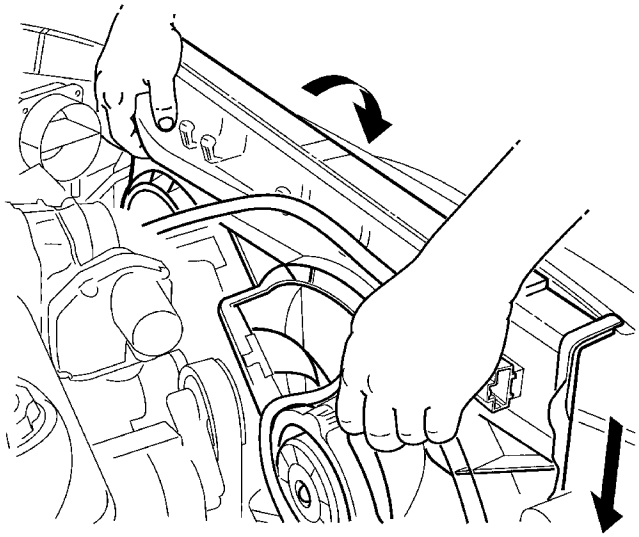
Note: When manoeuvring the condenser take care not to fracture the A/C lines.

20. Detach the condenser by lifting it out of the retaining brackets located on the radiator assembly.

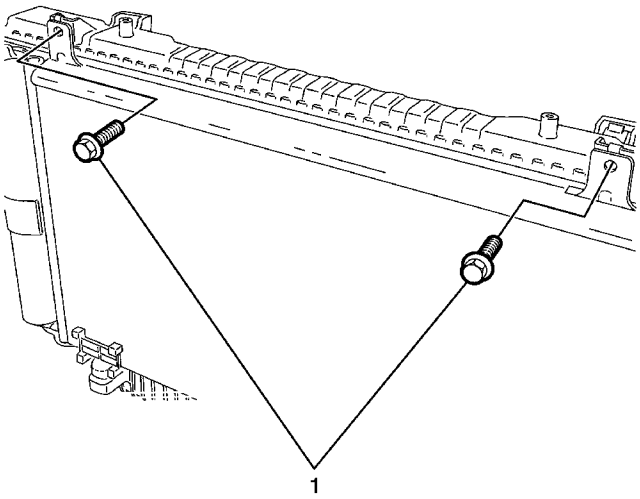


21. Remove the radiator and fan assembly, by tilting it forward and lifting it out of the rubber grommets located in the cross member.

Installation Procedure



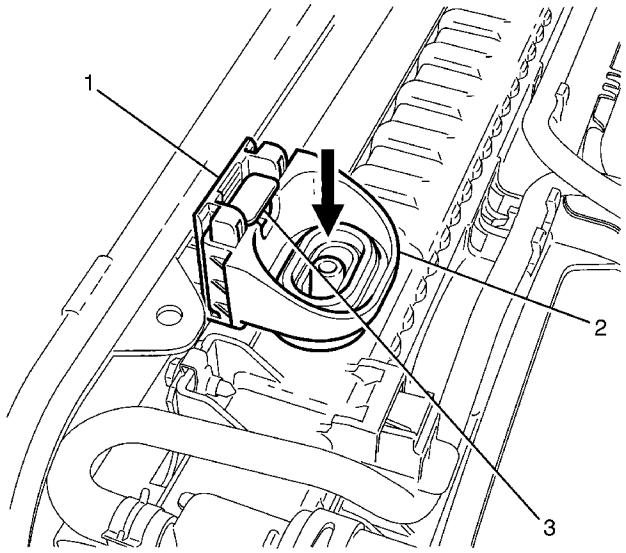
1. Install the radiator into the rubber retaining grommets located in the cross member.



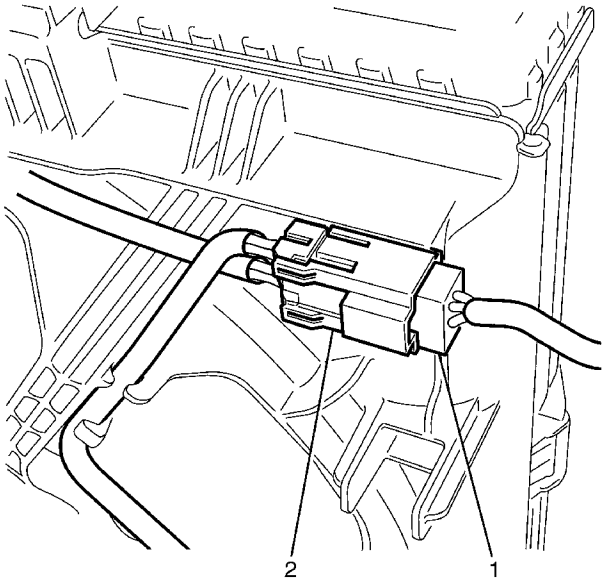
2. Install the condenser into the radiator

   Caution: Refer to Fastener Caution in the Preface section.

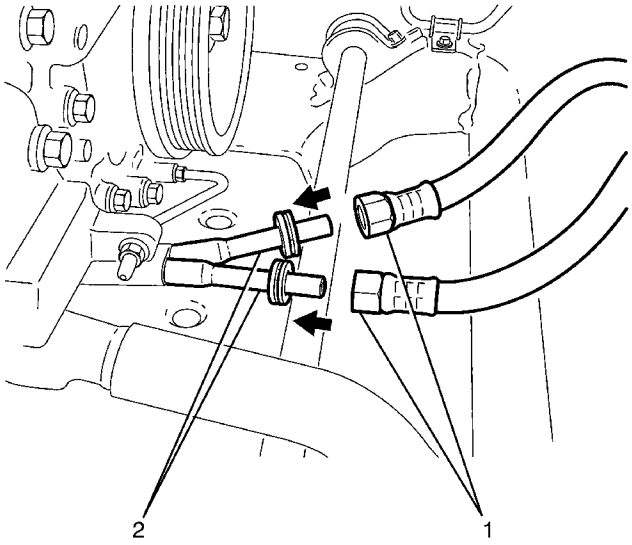
3. Install the 2 radiator and condenser retaining bolts (1) and tighten to **11 N·m (97 lb in)**.



4. Install the radiator retaining brackets (2), onto the radiator slide pin (1).
5. Secure the retaining brackets by pushing the securing lock (3) downwards until lock reaches bottom of radiator bracket.



6. Connect the cooling fans electrical connector (2) to the main wiring loom connector (1).



Note: Make sure the cloth protecting the hose openings from contamination is removed from the hose openings before carrying out the installation procedure.

7. Connect the flexible hoses (1) to the transmission cooler lines (2). Listen for an audible click to confirm fitting.
8. Push plastic cover forward along pipe and clip onto hose fitting.

Warning: Refer to Safety Glasses Warning in the Preface section.

Danger: To avoid any vehicle damage, serious personal injury or death when major components are removed from the vehicle and the vehicle is supported by a hoist, support the vehicle with jack stands at the opposite end from which the components are being removed and strap the vehicle to the hoist.

9. Raise and support vehicle. Refer to Lifting and Jacking the Vehicle.
10. Install the outlet hose to the radiator. Refer to Radiator Outlet Hose Replacement.
11. Lower vehicle.
12. Install the coolant air bleed hose. Refer to Engine Coolant Air Bleed Hose Replacement.
13. Install the coolant recovery reservoir hose. Refer to Coolant Recovery Reservoir Replacement.
14. Install the inlet hose. Refer to Radiator Inlet Hose Replacement.
15. Install the air deflector. Refer to Front Air Deflector Replacement.
16. Install the mass air flow meter. Refer to Mass Airflow Sensor/Intake Air Temperature Sensor Replacement for the 3.6L engine or Mass Airflow Sensor/Intake Air Temperature Sensor Replacement for the 6.0L engine.
17. Install the air intake duct. Refer to Air Cleaner Inlet Duct Replacement for the 3.6L engine or Air Cleaner Inlet Duct Replacement for the 6.0L engine.
18. Install the radiator air baffle and deflector. Refer to Radiator Air Upper Baffle and Deflector Replacement.
19. Install the engine cover. Refer to Engine Cover Replacement for the 3.6L engine or Engine Cover Replacement for the 6.0L engine.
20. Install the battery ground lead to the vehicle. Refer to Battery Negative Cable Disconnection and Connection.

21. Fill the cooling system. Refer to Cooling System Draining and Filling.
22. Inspect cooling system for leaks.

Radiator Air Lower Baffle and Deflector Replacement

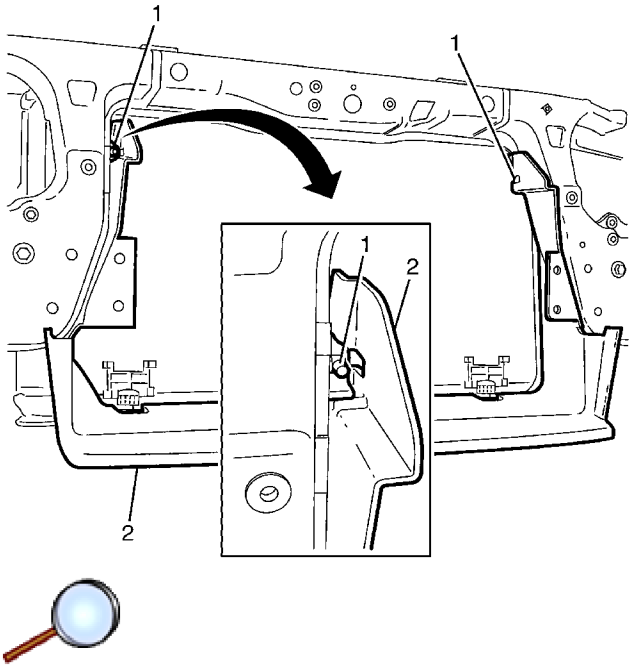
Removal procedure

Warning: Refer to Safety Glasses Warning in the Preface section.

Danger: To avoid any vehicle damage, serious personal injury or death when major components are removed from the vehicle and the vehicle is supported by a hoist, support the vehicle with jack stands at the opposite end from which the components are being removed and strap the vehicle to the hoist.

1. Raise and support vehicle. Refer to Lifting and Jacking the Vehicle.
2. Remove the air deflector. Refer to Front Air Deflector Replacement.
3. Remove the front fascia. Refer to Front Bumper Fascia Replacement.
4. Remove the front impact bar. Refer to Front Bumper Impact Bar Replacement.
5. Lower the vehicle.
6. Detach the ambient sensor. Refer to Ambient Air Temperature Sensor Replacement.
7. Remove the washer solvent container. Refer to Windshield Washer Solvent Container Replacement.
8. Detach the wiring loom from the duct.

Warning: Refer to Safety Glasses Warning in the Preface section.



9. Remove the retaining pins (1) on either side of the air baffle (2).
10. Remove air baffle out of locating lugs and remove from front of vehicle.

Installation Procedure

1. Install the air baffle into the locating lugs.

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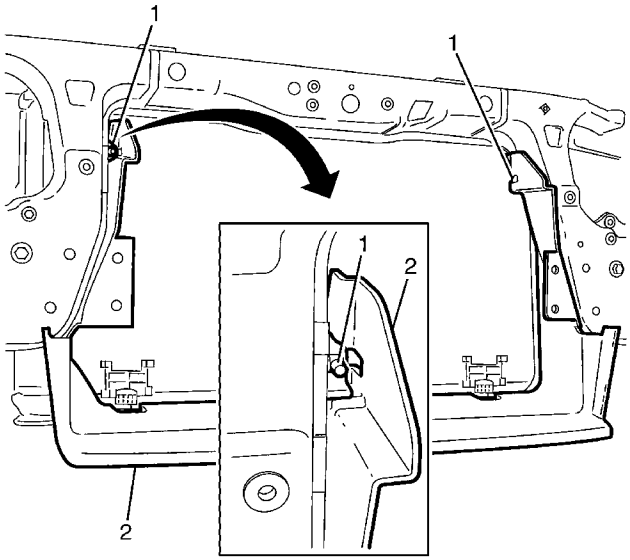


2. Install the air baffle retaining pins (1) located at either side of the baffle (2).
3. Attach the wiring loom to the duct.
4. Attach the ambient sensor. Refer to Ambient Air Temperature Sensor Replacement.
5. Install the washer solvent container. Refer to Windshield Washer Solvent Container Replacement.

Warning: Refer to Safety Glasses Warning in the Preface section.

Danger: To avoid any vehicle damage, serious personal injury or death when major components are removed from the vehicle and the vehicle is supported by a hoist, support the vehicle with jack stands at the opposite end from which the components are being removed and strap the vehicle to the hoist.

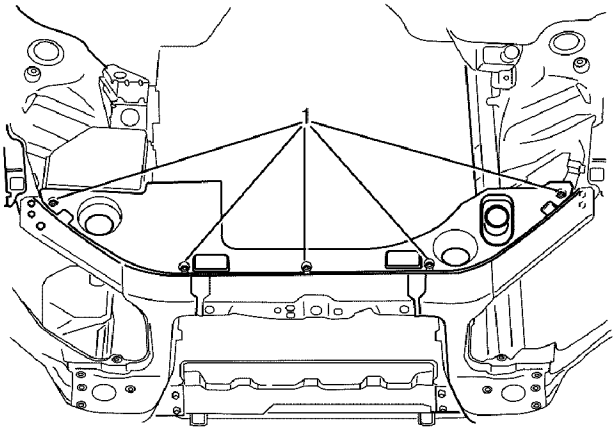
6. Raise and support vehicle. Refer to Lifting and Jacking the Vehicle.
7. Install the front impact bar. Refer to Front Bumper Impact Bar Replacement.
8. Install the front fascia. Refer to Front Bumper Fascia Replacement.
9. Instal the air deflector. Refer to Front Air Deflector Replacement.
10. Lower vehicle.
11. Inspect vehicle for correct alignment of body panels. Refer to Dimensions - Body.

Radiator Air Upper Baffle and Deflector Replacement

Removal Procedure - Up to 05 Feb 2007

Important: When a suitable hold open device is being removed or installed, provide alternate support to avoid the possibility of damage to the vehicle or personal injury.

1. Install a suitable hood brace to the vehicle.



2. Remove the radiator air baffle and deflector to front end module retaining scrivets (1).
3. Remove the radiator air baffle and deflector from the front end module.

Installation Procedure - Up to 05 Feb 2007

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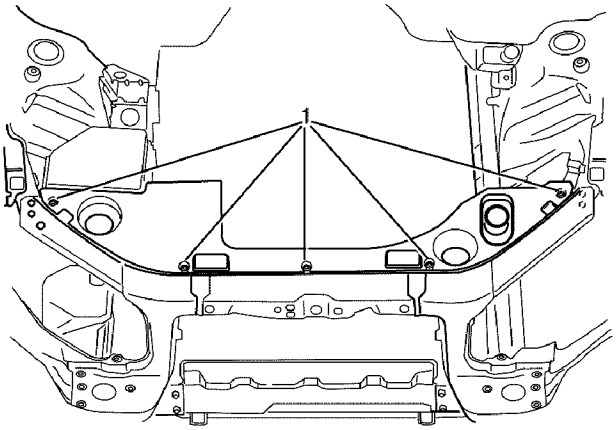


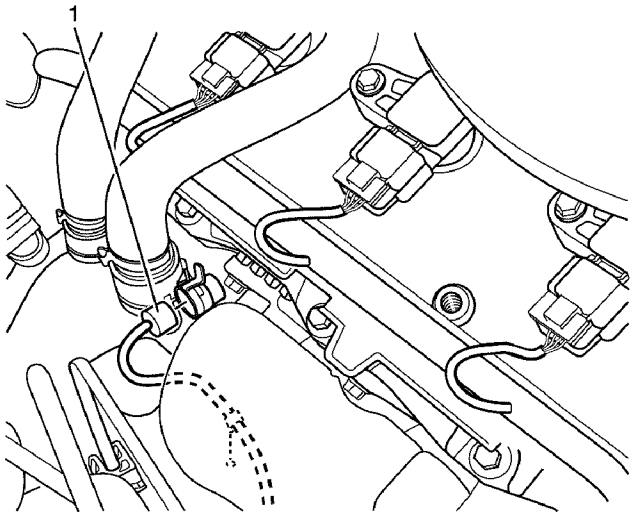
1. Install the radiator air baffle and deflector to the front end module.
2. Install the radiator air baffle and deflector to front end module retaining scrivets (1).
3. Remove the suitable hood brace from the vehicle.

Coolant Heater Replacement (3.6L)

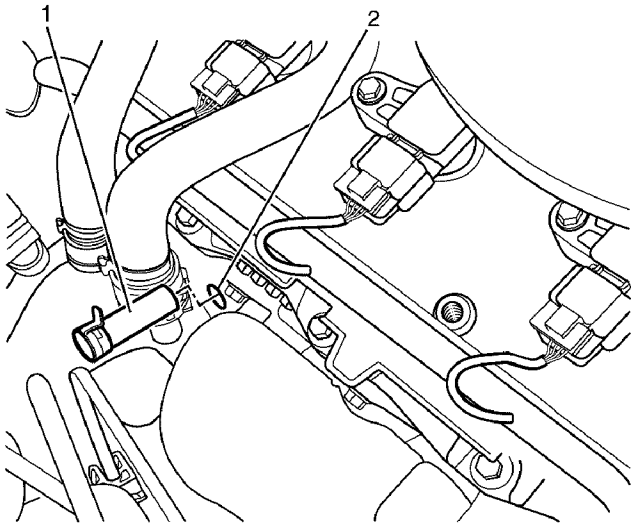
Removal Procedure

Warning: Refer to Battery Disconnect Warning in the Preface section.

1. Disconnect the battery ground cable. Refer to Battery Negative Cable Disconnection and Connection.
2. Drain the cooling system. Refer to Cooling System Draining and Filling.
3. Remove the engine covers. Refer to Engine Cover Replacement.



4. Disconnect the coolant heater cord electrical connector (1).



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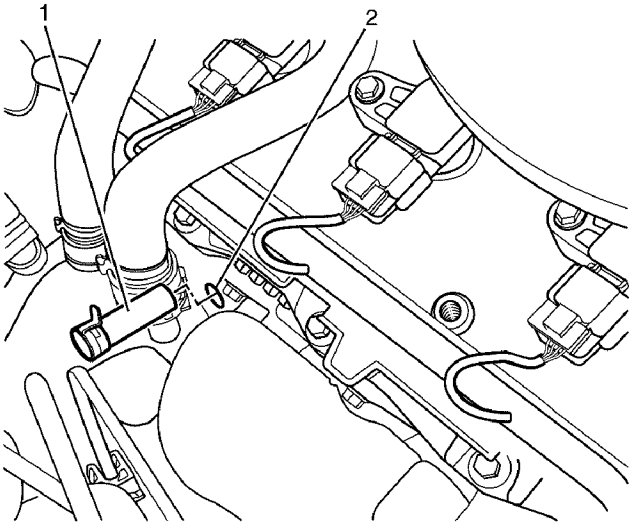
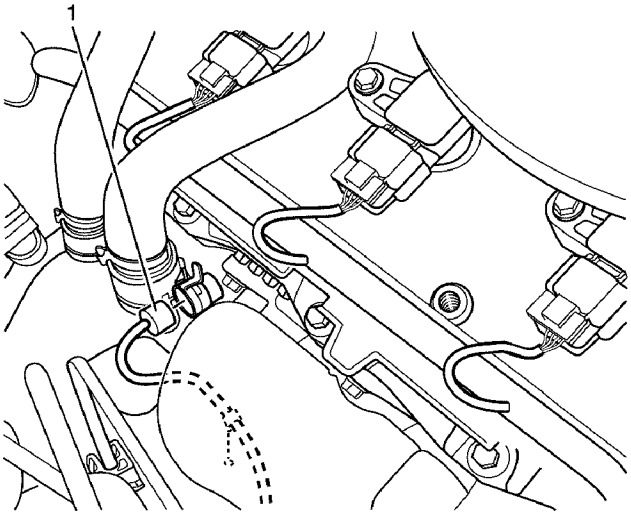
Note: Do not score the surface of the engine block hole (2) when removing the coolant heater (1).

5. Remove the coolant heater (1) from the engine block (2).

Installation Procedure



1. Install the coolant heater (1) to the engine block (2).



2. Connect the coolant heater cord electrical connector (1).
3. Fill the cooling system. Refer to Cooling System Draining and Filling.
4. Install the engine covers. Refer to Engine Cover Replacement.
5. Connect the battery ground cable. Refer to Battery Negative Cable Disconnection and

Connection.

Coolant Heater Replacement (6.0L)

Removal Procedure

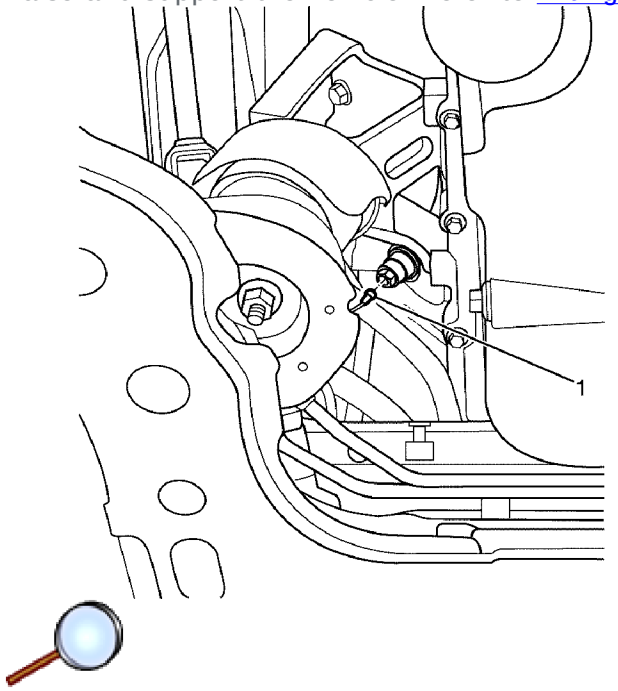
Warning: Refer to Battery Disconnect Warning in the Preface section.

1. Disconnect the battery ground cable. Refer to Battery Negative Cable Disconnection and Connection.
2. Drain the cooling system. Refer to Cooling System Draining and Filling.

Warning: Refer to Safety Glasses Warning in the Preface section.

Danger: To avoid any vehicle damage, serious personal injury or death when major components are removed from the vehicle and the vehicle is supported by a hoist, support the vehicle with jack stands at the opposite end from which the components are being removed and strap the vehicle to the hoist.

3. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.



4. Disconnect the coolant heater cord electrical connector (1).

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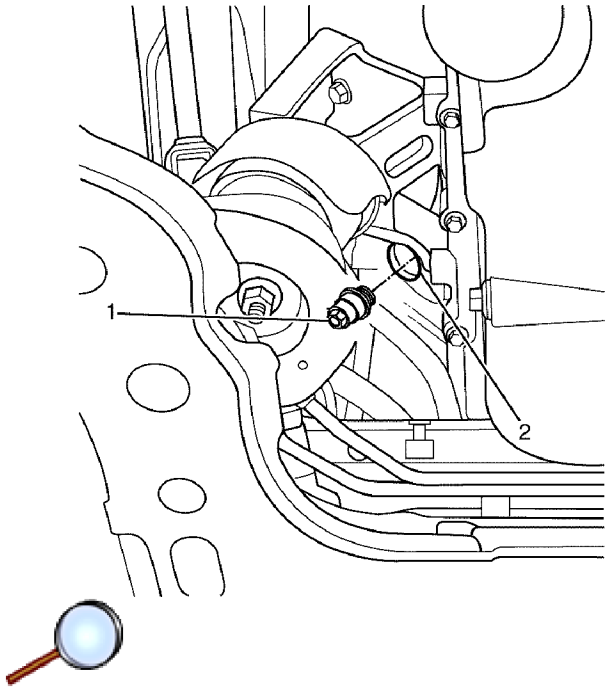
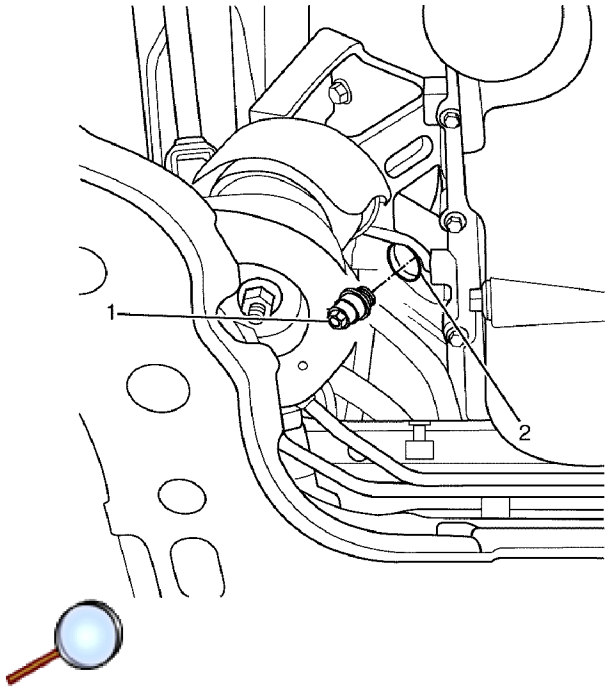


Note: Do not score the surface of the engine block hole (2) when removing the coolant heater (1).

5. Remove the coolant heater (1) from the engine block (2).

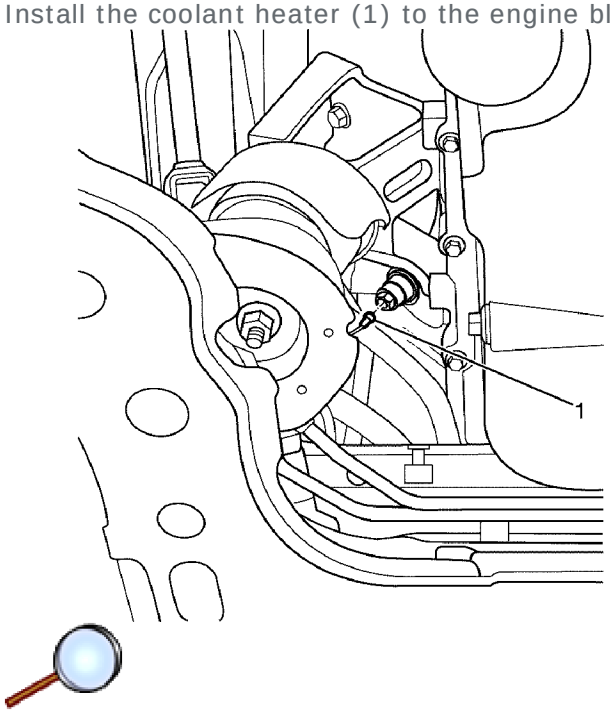
Installation Procedure



1. If reusing the old coolant heater (1), apply thread sealant GM P/N 12346004 (Canadian P/N 10953480), or equivalent to the threads.

Caution: Refer to Fastener Caution in the Preface section.

2. Install the coolant heater (1) to the engine block (2) and tighten to **50 N·m (37 lb ft)**.



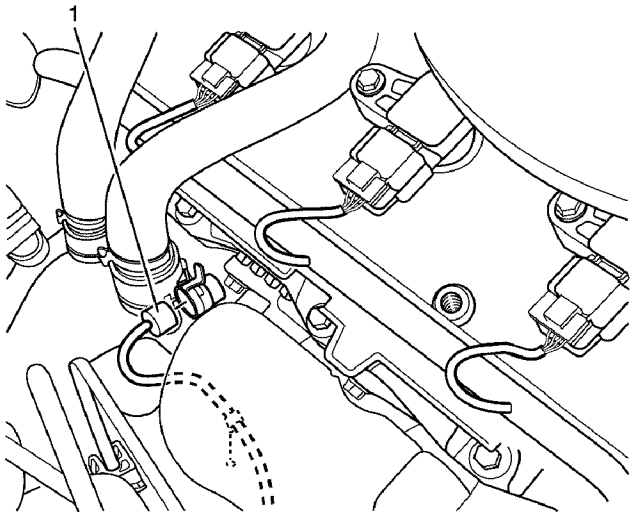
3. Connect the coolant heater cord electrical connector (1).
4. Lower the vehicle.
5. Fill the cooling system. Refer to Cooling System Draining and Filling.
6. Connect the battery ground cable. Refer to Battery Negative Cable Disconnection and Connection.

Coolant Heater Cord Replacement (3.6L)

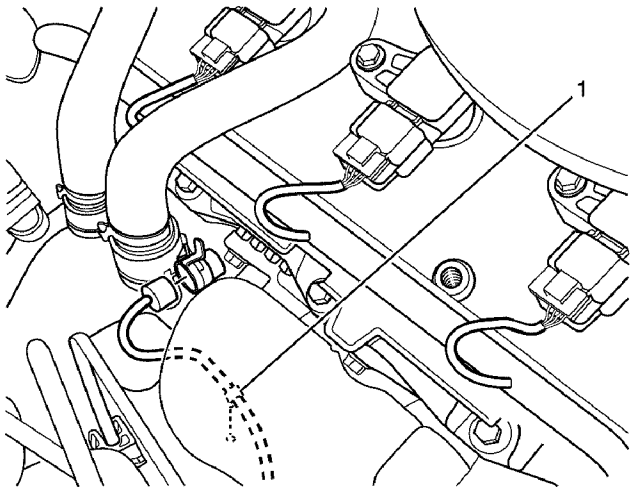
Removal Procedure

Warning: Refer to Battery Disconnect Warning in the Preface section.

1. Disconnect the battery ground cable. Refer to Battery Negative Cable Disconnection and Connection.
2. Drain the cooling system. Refer to Cooling System Draining and Filling.
3. Remove the engine covers. Refer to Engine Cover Replacement.



4. Disconnect the coolant heater cord electrical connector (1).



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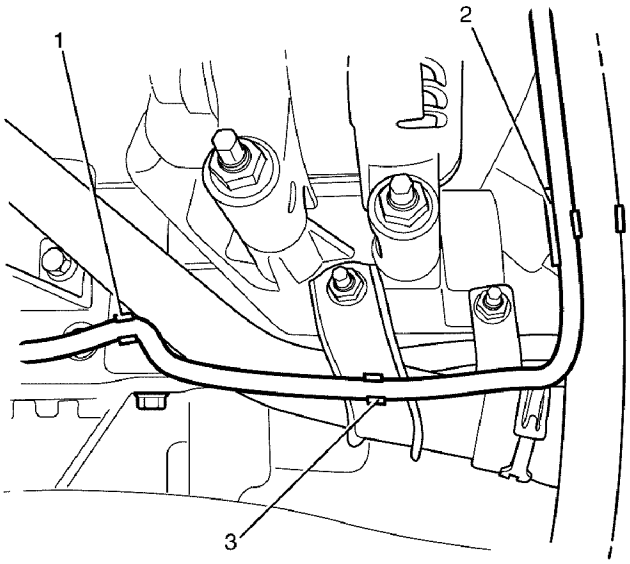
5. Disengage the coolant heater cord to wiring harness heat shield stud retaining clip (1).

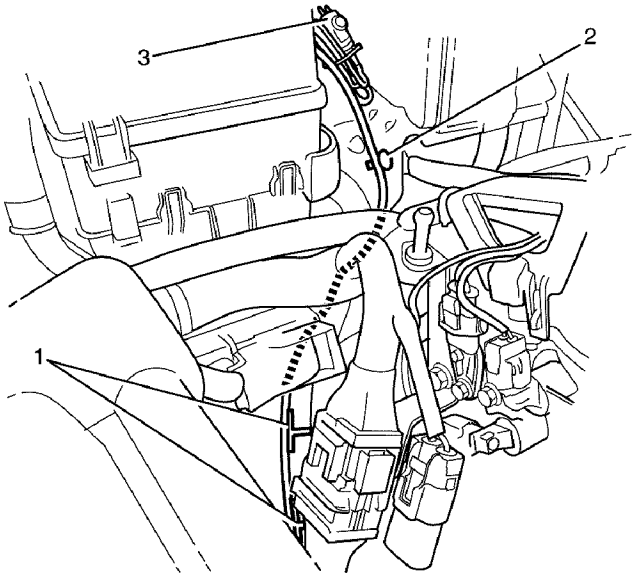
Warning: Refer to Safety Glasses Warning in the Preface section.

Danger: To avoid any vehicle damage, serious personal injury or death when major components are removed from the vehicle and the vehicle is supported by a hoist, support the vehicle with jack stands at the opposite end from which the components are being removed and strap the vehicle to the hoist.

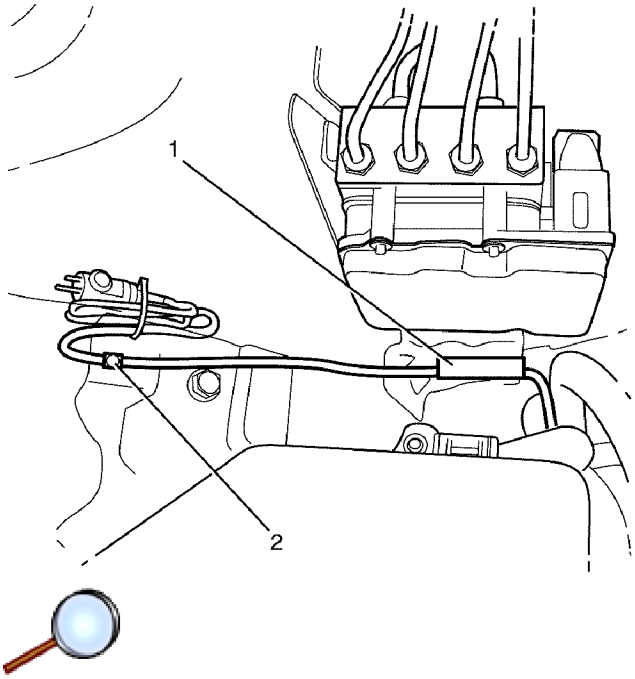
6. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.



7. Disengage the coolant heater cord to engine block retaining clip (1).
8. Disengage the coolant heater cord to coolant inlet pipe bracket retaining clip (2).
9. Lower the vehicle.

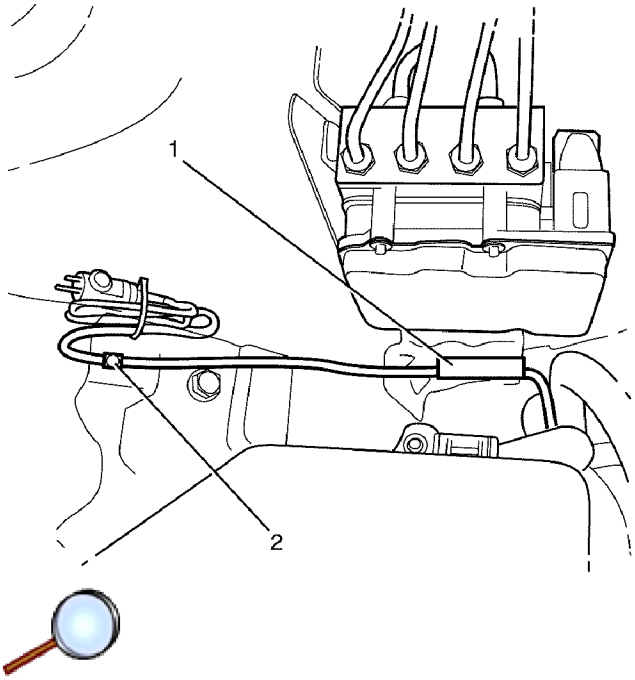


10. Disengage the coolant heater cord to generator cable retaining clips (1).
11. Disengage the coolant heater cord to vehicle body ground cable bolt retaining clip (2).

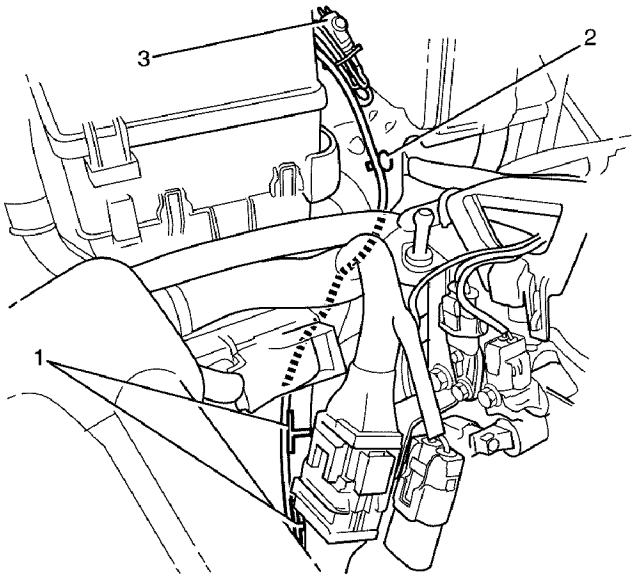


12. Disengage the coolant heater cord to vehicle body retaining clip (2).
13. Remove the coolant heater cord (1) from the vehicle.

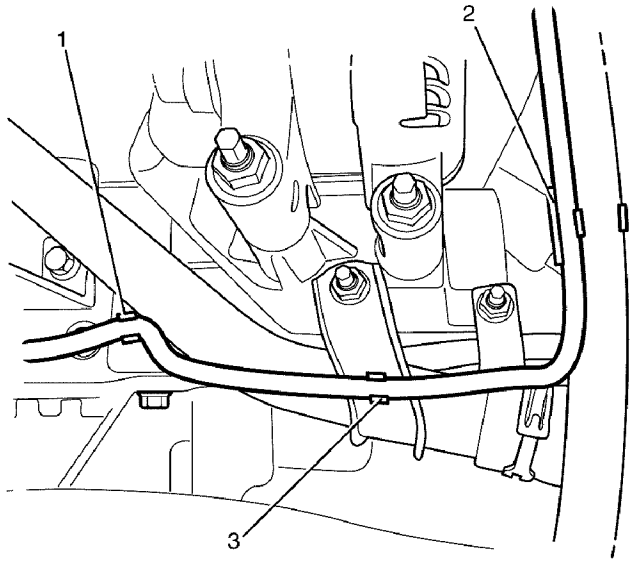
Installation Procedure



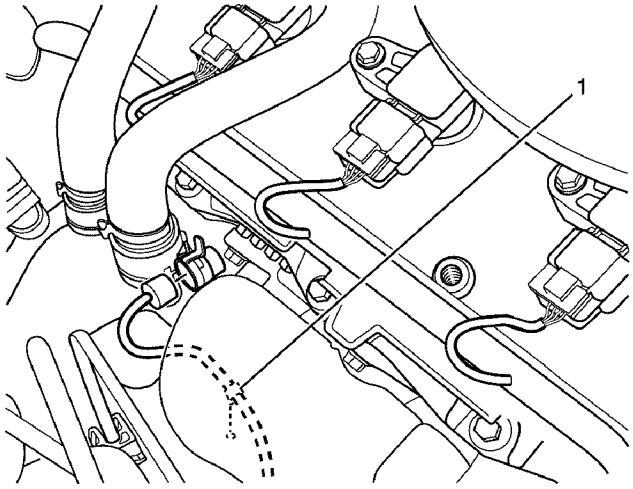
1. Position the coolant heater cord (1) to the vehicle.
2. Engage the coolant heater cord to vehicle body retaining clip (2).



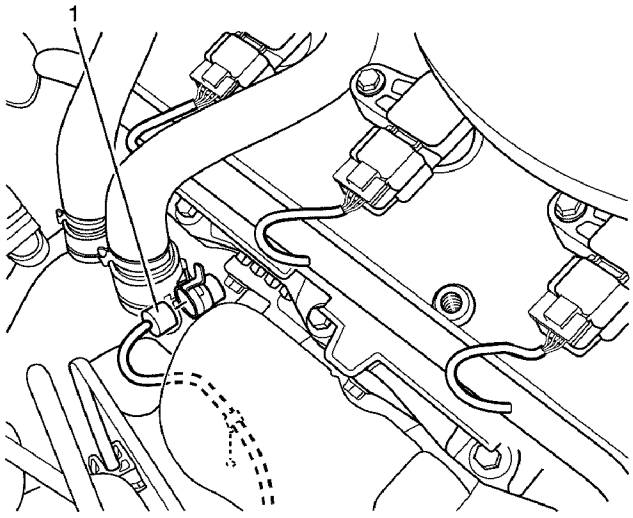
3. Engage the coolant heater cord to vehicle body ground cable bolt retaining clip (2).
4. Engage the coolant heater cord to generator cable retaining clips (1).
5. Raise the vehicle.



6. Engage the coolant heater cord to coolant inlet pipe bracket retaining clip (2).
7. Engage the coolant heater cord to engine block retaining clip (1).
8. Lower the vehicle.



9. Engage the coolant heater cord to wiring harness heat shield stud retaining clip (1).



10. Connect the coolant heater cord electrical connector (1).
11. Fill the cooling system. Refer to Cooling System Draining and Filling.
12. Install the engine covers. Refer to Engine Cover Replacement.
13. Connect the battery ground cable. Refer to Battery Negative Cable Disconnection and Connection.

Coolant Heater Cord Replacement (6.0L)

Removal Procedure

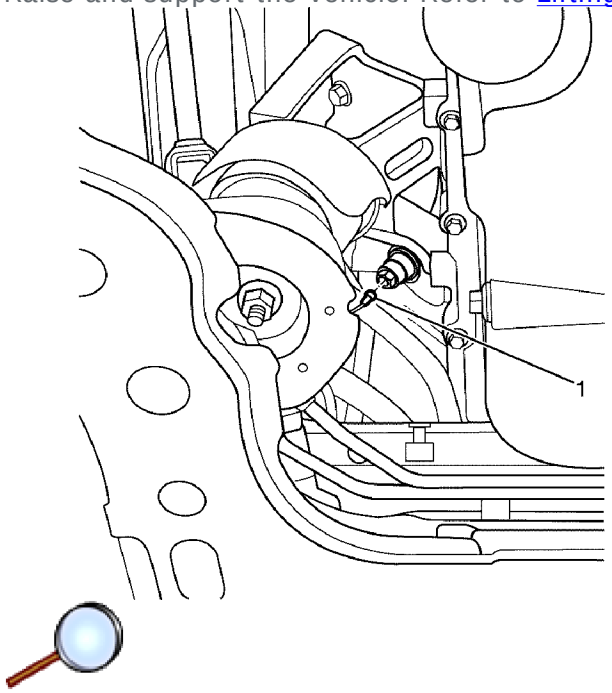
Warning: Refer to Battery Disconnect Warning in the Preface section.

1. Disconnect the battery ground cable. Refer to Battery Negative Cable Disconnection and Connection.

Warning: Refer to Safety Glasses Warning in the Preface section.

Danger: To avoid any vehicle damage, serious personal injury or death when major components are removed from the vehicle and the vehicle is supported by a hoist, support the vehicle with jack stands at the opposite end from which the components are being removed and strap the vehicle to the hoist.

2. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.



3. Disconnect the coolant heater cord electrical connector (1).
4. Lower the vehicle.

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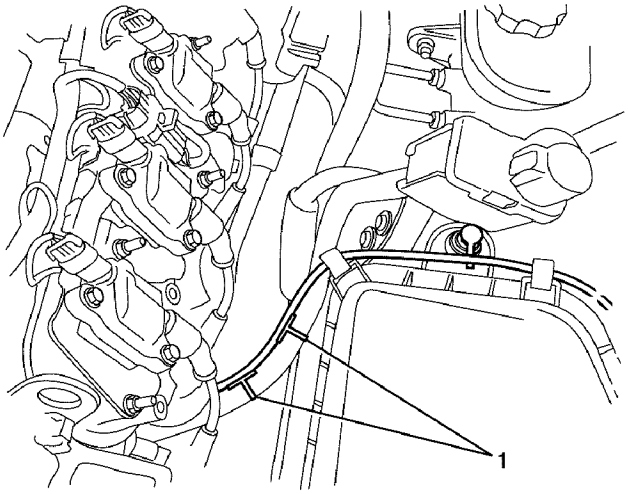
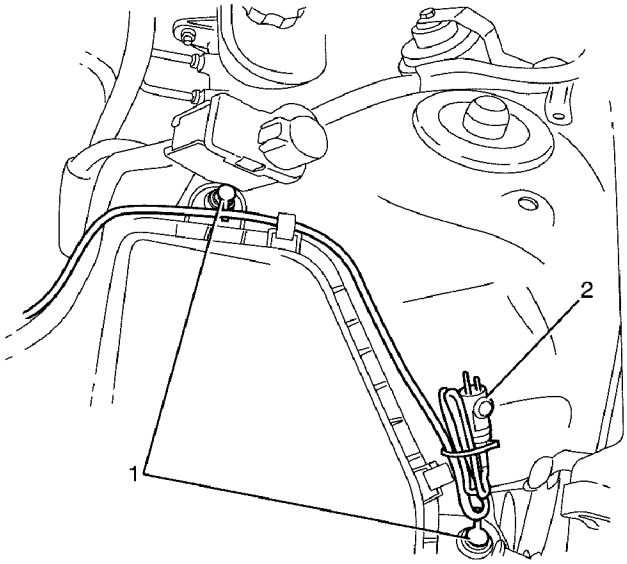
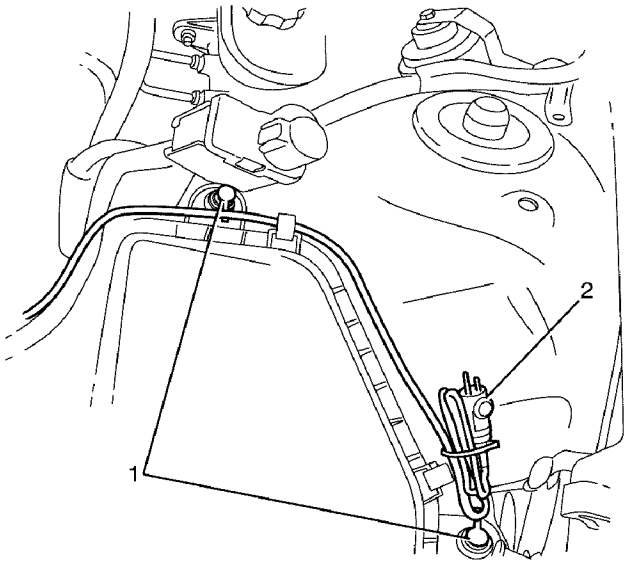


5. Disengage the coolant heater cord to generator cable retaining clips (1).

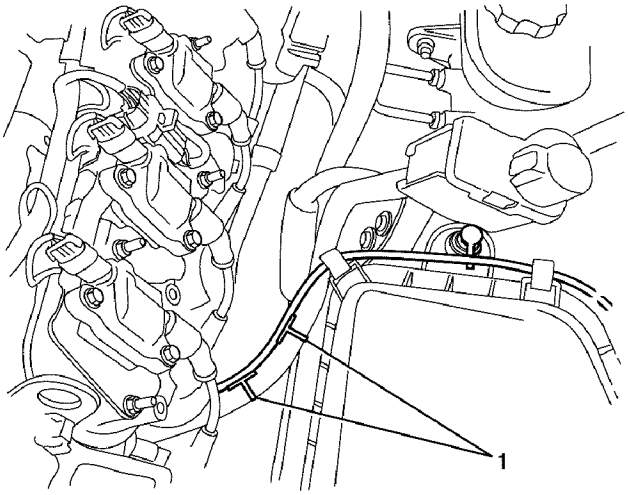


6. Disengage the coolant heater cord to air cleaner assembly stud retaining clips (1).
7. Remove the coolant heater cord (2) from the vehicle.

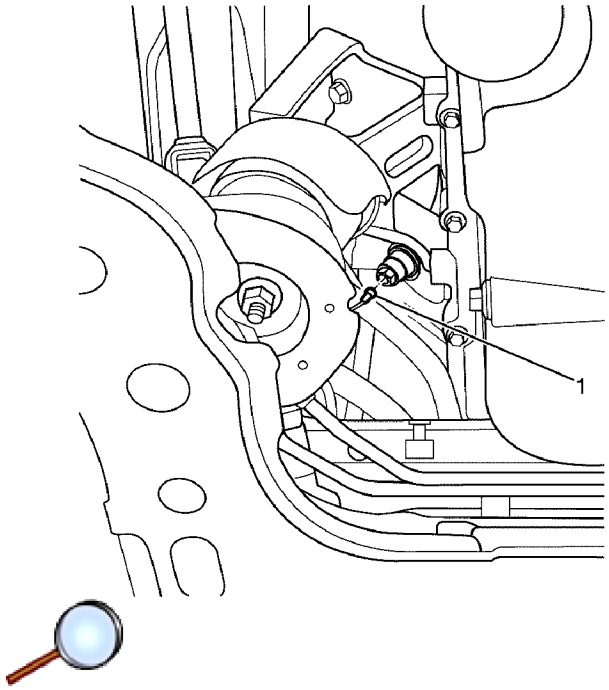
Installation Procedure



1. Position the coolant heater cord (2) to the vehicle.
2. Engage the coolant heater cord to air cleaner assembly stud retaining clips (1).



3. Engage the coolant heater cord to generator cable retaining clips (1).
4. Raise the vehicle.



5. Connect the coolant heater cord electrical connector (1).
6. Lower the vehicle.
7. Connect the battery ground cable. Refer to Battery Negative Cable Disconnection and Connection.